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# GAS JOURNAL

## LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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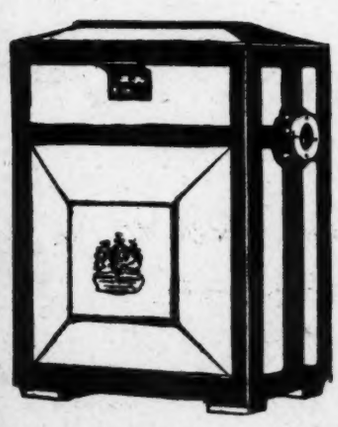

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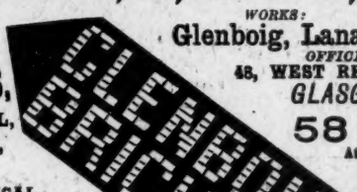


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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLIII., No. 2878.] TUESDAY, JULY 9, 1918. [70TH YEAR.


## EDITORIAL NOTES.

### The Infinitesimal Relief Bill.

THE President of the Board of Trade (Sir Albert Stanley) is the victim of circumstance so far as the measure is concerned which he introduced last week, and which will be known as the Statutory Undertakings (Temporary Increase of Charges) Bill. He had no alternative but to accept, as the foundation for the Bill, the report of the Select Committee of the House of Commons who considered recently the applications for relief from certain gas companies, and issued a report which in itself is so contradictory as to be one of the most fantastical documents that has ever been presented to Parliament. The Bill (which is a short one) was submitted for first reading last week by Sir Albert, and was down for second reading last evening. The Board of Trade are taking powers by it to deal not only with gas companies, but with tramway undertakings (including light railways constructed wholly or mainly on public roads), and undertakings for the supply of water and electricity. This is curious; seeing that the Committee, upon whose recommendations the Bill is based, only heard the case of gas companies, in large part operating under a sliding-scale, which has no relation whatever to the other companies. As these were not before the Committee, and have not been heard, they may object to being roped-in with gas companies, though, in truth, most of them are under the Bill—having fixed maximum or unlimited dividends—in a far better position than the sliding-scale gas companies, inasmuch as to them half the average rate of dividend for the three financial pre-war years will apply, and those were years in which, at any rate, some of the London electric supply companies were paying their best dividends. It may, of course, be an advantage to the gas companies that these companies are brought within the meshes of the singular recommendations of the Select Committee, as on second reading this should strengthen the opposition in the House to the reckless notions of the Committee as to what is requisite to maintain public interest in gas capital and the financial stability of gas undertakings.

The Bill—which also applies to Scotland and Ireland, is to have effect for the duration of the war and for two years after, and no longer. It provides that applications under it shall be made by the undertaking concerned to the appropriate Government Department—enacts that the Department in question may modify any statutory provisions regulating the charges to be made by the undertakings "in such "manner, and subject to such conditions, as appear to "the Department to be just and reasonable." If the Bill stopped there, we should welcome it; but it goes on to restrict whatever may be the ideas of the Department as to what is just and reasonable, by providing that no modification shall be authorized which will in the case of a local authority increase the statutory maximum charge by more than 50 p.ct., or which is more than sufficient, so far as can be estimated, to enable the undertaking to be carried on without loss. This gives the Departments concerned a superabundance of latitude in connection with municipal undertakings. But when we come to private enterprises, it is proposed (in accordance with the recommendation of the Committee) that "no modification shall be authorized "which is more than sufficient to enable a dividend on the "ordinary stock or shares of the undertaking to be paid at "half the standard or maximum rate of dividend, if any, "prescribed for the undertaking, or at half the pre-war "rate of dividend [estimated on an average of three years] "whichever is lower." We are sorry that a business man such as Sir Albert Stanley should—in these profiteering days in other directions, of 5 p.ct. War Loan and Bonds with Government security, and of heavy income-tax—have to father a measure which will leave numerous holders of a large amount of capital in sliding-scale gas companies with nothing but a shred of a return upon the money that is being employed in the service of the public and of the Government.

Reverting to the inclusion in the Bill of concerns which have no similarity to sliding-scale gas companies, or for the matter of that to maximum-price gas companies, seeing that the heaviest charges of gas undertakings are for their raw material coal and labour (which are disproportionately heavy compared with concerns that only use coal for the purpose of power, and more machinery than labour), let us examine the position. In the case of maximum-price gas companies, one difference between them and sliding-scale companies is that dividend deficiencies can be made good out of future profits, which is not the case in sliding-scale concerns. The same applies to the 10 and 7 p.ct. capital in water companies. In cases where the full maximum dividends were declared during the three years before the war, the worst that can happen to them under the Bill is that they will be reduced to 5 and 3½ p.ct. on the two classes of capital. Sliding-scale gas capital holders now wish that nothing worse than this awaited them, poor as 3½ p.ct. is in these times of heavy obligations and income-tax, especially in the case of those small holders of capital for whom the Select Committee dissembled their love, and then speedily kicked them down stairs. Coming to the electricity supply companies, they are under the General Acts unlimited as to the ordinary dividends they may pay, and their maximum prices are generally 8d. or 7d. per unit. Only in the case of certain electric power companies is there any sliding scale of price and dividend, and then the standard dividend is, we believe, 8 p.ct. as compared with the 3½, 4, or 5 p.ct. in the case of sliding-scale gas capital—the major part being at 4 p.ct. Many of the London electricity concerns have been paying excellent dividends during the war, through the relatively high point contrasted with the gas companies at which their maximum prices stand. For instance, take an electric supply company with a maximum price of 8d. per unit and a gas company with a standard price of 3s. per 1000 c.ft. The relation is only 4½ units to 1000 c.ft.; while the Coal Controller in his rationing scheme has adopted 12 units as being equal to 750 c.ft., or 16 units per 1000 c.ft. According to the Coal Controller, therefore, an electricity company with an 8d. maximum price possess [16 units × 8d.] what would be the equivalent of a 10s. 8d. standard price for gas. There is no similarity between the positions of electricity companies and gas companies; and it is utterly impossible for the Bill to produce equity between them. In fine, however examined, the gas companies are in this matter always found at a disadvantage. While many of the electric supply companies have the power, so long as they are able, to pay unlimited dividends subject to a revision of price (if asked for) once in seven years, a mass of gas capital has been issued—and under the sliding-scale at a premium—on a 3½, 4, and 5 p.ct. basis, and most of the investors now holding original capital have paid prices for it to yield them, on the

strength of Acts of Parliament, 4½ to 5 p.ct. Yet the Bill provides that they shall now have (subject to income-tax) only 1¾, 2, and 2½ p.ct.! It is hoped that the dignity, intelligence, and sense of justice of the majority of our legislators will prevent this wrong being perpetrated.

If the Bill was read a second time last evening, the rapid progress since its introduction will have somewhat negatived active advisory movement on the part of the National Gas Council. It was, of course, impossible until the text of the Bill was available, for the Executive Committee to determine precisely the best course to take. It is hoped that those responsible for the management of gas undertakings will promptly adopt the suggestions contained in the circular-letters of the Council, and communicate with the members of Parliament in their constituencies and with their shareholders. Even if the shareholders are not able to take action in time for the second reading of the Bill, they will have an opportunity of influencing members before the more important Committee stage of the Bill is reached. If the Bill came on for second reading last evening, it is hoped that, on behalf of the industry, a strong protest was made against the Committee's recommendations. Amendments, it should be here explained, cannot be moved at the second-reading stage; and it would not be in the interests of the industry to propose the rejection of the measure, having in view the saving of the infinitesimal relief for the worse days ahead. Perhaps after the protest, the best course will be, when the Bill is considered in Committee, to move amendments which, if successful, would at least ensure that the companies shall not be restricted to, and their most vital interests injured by, the proposed shadow of relief. Everything, therefore, that can be done should be done without loss of time by those responsible for the direction and management of gas companies, as well as by shareholders, in the way of supplying information to local members of Parliament. This cannot be too urgently impressed upon all. The present Bill applies to every gas company during the reign of abnormal conditions; and who among them knows how soon relief may be desired?

## The New Fuel and Lighting Order.

THE text of the Fuel and Lighting Order has now been published in the "London Gazette;" and it is expected that by the 20th of this month, official information concerning it will be in the possession of every householder in England and Wales—nearly three weeks after the date that it comes into operation. The expectation as to the distribution of the information may not be realized, if precedent in connection with Government documents succeeds on this occasion in maintaining itself. However, the new Order is a voluminous composition, containing some 130 clauses. If householders had to make themselves acquainted with the whole of the contents, it might at once be taken as hopeless to expect so much from them. But it will be necessary for every responsible official of every gas undertaking to extend his knowledge pretty completely to the full text of the Order, so as to ascertain not only what the consumer may do, but what obligations attach to his concern in taking part in carrying out the Order, and in seeing that it is strictly complied with. Broadly speaking, so far as the ordinary householder is concerned, his scale of rationing is quite plain. If there are any exceptional circumstances attaching to his position, the Order has been planned with such detail that in most cases it will be found that some provision has been made whereby he can have the special circumstances dealt with.

To a large extent, the information given by Mr. E. Willis recently ["JOURNAL," June 25, p. 597] has discounted interest in the general outlines of the scheme; but there have been so many general modifications that all that has gone before should be taken as cancelled, and the Order as it now stands be alone accepted. The Order applies to all private heating and lighting, other than to large industrial works. Even in the case of premises with private gas or electricity generating plant, fuel must now only be used to an extent that will provide the proper gas or electricity rations. This single illustration indicates the comprehensive design of the Order. Originally the scheme was founded upon a division of the country into three zones, in each of which the coal rationing varied somewhat. This has now been simplified by division into two irregular areas, north and south—the northern one having (owing principally to climatic considerations) a slight advantage in respect of coal allowance over the southern one, which includes the Metropolitan area. For heating or cooking purposes, the coal allowance shown by the table that is printed elsewhere in this issue can (in part or else wholly) be converted into gas at the rate of 15,000 c.ft. per ton, or 800 units of electricity. As to the gas equivalent of the ton of coal, the Coal Controller is a considerable gainer, owing to the set-off which he obtains in regard to coke; but with electricity he is a considerable loser, as the electricity generating-stations are few and far between that can generate current on an average consumption of 2·8 lbs. of coal per unit. The average for the country is 4½ lbs., which means that nearly 1¾ tons of coal are required at the average fuel-consuming generating station to produce the 800 units allocated to substitute a ton of coal for heating. But the Coal Controller has made his position still worse by increasing the quantity of electricity allowed for lighting under the second part of the scheme—a consideration which he has not extended to gas. The allowance for lighting is altogether distinct from the fuel or heating part of the Order, and is based solely on the number of rooms, and has nothing whatever to do with the coal ration. But why there should have been a revision of generosity in respect of lighting in one case and not in the other is not apparent, in view of the provision that "gas or "electricity allowed for lighting under this clause may, at "the option of the consumer, be used for other domestic "purposes, but cannot be converted into coal."

Originally it was proposed that in a one to three room house 7500 c.ft. of gas should be allowed for lighting or 100 units of electricity, increasing according to the number of the rooms until, for a nineteen to twenty-one room house, 30,000 c.ft. of gas or 400 units of electricity were reached. The quantities of gas for lighting remain the same, but the 100-unit allowance is now 120 units, and the 400-unit allowance 480 units, with *pro ratâ* advances in the intermediate figures. So that in respect of every house where there is electric heating and lighting, the Coal Controller has further sacrificed coal economy and his own position, and favoured the electric undertakings. This is perfectly clear from the calculation already made. But let us take as a further illustration a nine-room house, with an allowance of 8 tons of coal. It is not every household that requires fires in every room. Some bedrooms may rarely have a coal fire in them. Assume that in such a house 5 tons of coal are consumed per annum; and 3 tons of coal are given up for electric-radiators. The householder is entitled to use 2400 units, which, on the average generating consumption per unit, is equal to nearly 5 tons of coal. The Coal Controller, therefore, loses for his coal-economizing scheme 2 tons of coal through this consumer relinquishing coal to use electricity for heating purposes; and he may employ part of his 240 lighting units also for heating, which will require about ½ ton of coal more. Thus it will be seen how much more coal consumption than his coal ration is entailed by the householder using electric heating. The coal and gas consumer, in similar circumstances, would be allowed three times 15,000 c.ft. of gas for heating and 15,000 c.ft. for lighting—a total of 60,000 c.ft., which would require 4·8 tons of coal, but would return to the Coal Controller (say) 2·4 tons of coke, *plus* tar and ammonia. The 2·4 tons of coke is only 0·6 ton short of the amount of coke required as a substitute (according to the terms of the order) for 2 tons of coal; so that the coal and gas consumer does not exceed his coal ration, while giving to the nation valuable bye-products from the coal used to manufacture the gas.

In the circumstances, we fail to see—the goal being economy—why there has been relaxation in the allowance in regard to lighting by electricity. If the Controller had lessened the electricity heating allowance per ton of coal, he would have been studying the object he is striving so hard to attain. But he has not done so. On the other hand, the change that he has made in the electric lighting ration brings the illuminating values of gas and electricity nearer to one another. The conversion equivalents that have been chosen for the purposes of the Order are 750 c.ft. of gas and 12 units of electricity in place of the 10 units formerly proposed. So that, taking an ordinary inverted gas-lamp, the 750 c.ft. would give 15,000 candle-hours, and with the metallic filament lamp the 12 units of electricity would give 9600 candle-hours. But at the war time price of 4s., the 750 c.ft. would cost 3s.; and the twelve units, at only 6d., 6s. This great difference in cost reveals itself in a more material manner with the higher figures. For (say) a twenty-room house using 30,000 c.ft. of gas for lighting, this would cost

at 4s., £6; while the 480 units of electricity would cost, at 6d., £12. The question of cost, however, does not come within the province of the Coal Controller; the question of the economy of fuel does. This being the primary consideration, the new rationing of gas and electricity does not do full justice to the former, while it confers upon the latter a liberality which is entirely opposed to coal economy; and this is proved without having recourse to the additional support which relative thermal values would afford.

To other matters. Gas undertakings will have to see that they have their representative upon any Local Fuel and Lighting Committee that may be appointed; and they will have to know their obligations in respect of the Order. These will not be by any means light, even when the Order (if ever) gets into smooth working order. The Local Fuel Overseer (who should be appointed by the Local Authority by July 14) must be a super-man, of untiring energy, and with a mighty grasp of affairs; and then he will never get through the work that is imposed upon him (unless his district be small or sparsely populated) without a considerable amount of helpful machinery about him; for he will be appealed to on all sorts of matters, and have a judicial part to play, from which appeal can be made to the Local Fuel and Lighting Committee, and ultimately to the Coal Controller, beyond whom it will be impossible to get. The Overseer will also have to make assessments, and abrogate allowances if exceeded, and set up fresh grants. He will act with the advice of the gas and electricity representatives upon the Committee; or if a Committee be not appointed, representatives of the gas and electricity undertaking must be nominated for the purpose of discharging the duties falling upon such representatives. The responsible officers of the gas undertakings (already with claims absorbing full time) must study the detail of procedure, and must be fully cognizant of what they themselves have to do, and what their consumers are expected to do. What it has taken the "London Gazette" thirty-four columns to explain we cannot here condense into few words. Much more information is given elsewhere in this issue; but, even so, there will be danger of violation of the Order if the full text is not diligently studied, and the pertinent points noted. Then only time and lack of staff can be the excuses for any non-fulfilment of obligation. Whether such excuses would be deemed satisfactory, we do not know.

But it is everybody's business, whether disagreeing with the new Order or not, and whether or not accomplishing the task of digesting the whole of its terms this side of the end of the war, to do his or her part to make it a success. The important mining centre of the Pas de Calais is now under German gun-fire, and the railway lines that normally deal with the production of coal there are required to serve the battle front. We must as Allies help to keep France supplied with coal to the utmost possible extent. A very considerably increased quantity of coal has to be dispatched to Italy each month; and this country is to-day supplying Italy with 8½ million tons per annum. Over and above this, a strategic reserve has to be built-up in Italy. The Coal Controller has his work cut out. What he is legislating for in this new Order is that the householders rationing scheme shall save about 8 to 9 million tons of coal, leaving a balance of 26 or 27 million tons to be provided by improved output and economies in industrial and transport consumption. It is not too much to describe this as a serious position, which can only be dealt with in a serious manner, and by universal help. In the first place, assistance will be particularly needed to get the requirements of the Order into smooth working; for, though it came officially into operation on the 1st inst., some little time must elapse before the machinery is inaugurated, requisitions are issued and filled up, and certificates are granted in response. Fortunately we are now at the lowest level of the year in respect of the consumption of heating and lighting agents.

## "Constructive Distillation."

SINCE Lord Moulton, in his brilliant Presidential Address to the Institution of Gas Engineers, called upon the gas industry to wake up and to reform its ways so as to make the utmost of its wonderful heritage, professional gas men have found cause to ponder a good deal over his Lordship's distaste for the phrase "destructive distillation," and his preference for the words "constructive distillation." There is something inspiriting and alluring about them; and, if they are borne well in mind, they should inspire every man, whatever his retort conditions, to work to get the utmost out of them that is of real value. Before Lord Moulton criticized "destructive distillation" as a misdescription of carbonization in gas-works, much work had been done on the methodical steaming of charges in continuous vertical retorts; and there had been revelations as to certain results, which were not only continuous, but were confirmed at different works and under different conditions. It had been shown that the water gas produced by the steaming not only increased the quantity of gas made per ton of coal, and the total B.Th.U. in gaseous form per ton, but that the good quality of the gas in relation to the increased production was secured through the steam acting as both a carrier and a protector against destruction of the hydrocarbons in the gas as evolved. The benefits do not stop there. An enrichment of the liquid products accompanies the gas production results.

In an article published in other columns to-day, Mr. Tim Duxbury, of Oldham, calls this "Constructive Distillation;" and it is a very apposite term. Mr. Duxbury's experience is with the "Dempster-Toogood" continuous verticals; and the issues of his experience are noteworthy. It will be observed that normal working conditions have been adhered to throughout the tests as regards temperatures—the only variation being the additional systematic steaming. Yorkshire pea nuts have been used with the wartime excess of deleterious matter; and consignments from eight different contractors have had to be used indiscriminately. The tests, therefore, had no special advantages conferred upon them. The "Dempster-Toogood" system, it will be seen, was, in normal circumstances, giving a gas production considerably higher than the guarantee; but with steaming the tests have variously shown results ranging per ton of coal from 17,028 c.ft. (465 B.Th.U. gross) to 23,521 c.ft. (460 B.Th.U. gross)—the total B.Th.U. realized per ton being greatly enhanced. One thing that is not included in the article is an analysis of the gas and tar. An analysis of the gas would be of interest, in view of what has been advanced regarding the necessity of adjusting temperatures in order to limit the quantity of carbon dioxide in the gas. Nor is special reference made to the subject of fuel oils. Perhaps we may have a supplementary statement from Mr. Duxbury which will add to the interest of his article. However this by the way. As to the tar and ammoniacal liquor, there were enlarged productions, details concerning which will be found in the article. If there is no virtue in steaming beyond the augmentation of gas volume, how are these and other qualitative results to be accounted for? The fact of quality being maintained at a higher level than might have been expected with the greater make, is too well established to be capable of being overthrown by simple negation. The steaming *per se* adds nothing to quality; it is the beneficent part that steaming plays within the retort that does so.

It will be observed that the coal throughput of the Oldham retorts has been reduced. What matters this, so long as the output is approximately the same? The lessened throughput, with approximately the same output, means economy—economy in the use of coal, which is a matter of the utmost importance in these days of short coal deliveries and high prices. Work, wherever it takes place, and upon whatever system of retorts, which increases production volumetrically and (in total) qualitatively, is constructive. So we are glad to hear of encouraging experimental investigations not only on vertical retorts but upon horizontal ones, which have given higher results per ton of coal, through the protective and vehicular agency of the steam in respect of the hydrocarbons. Another improvement that has been noticed is the percentage reduction of incombustible gases in the output of steamed horizontal retorts, as well as the lowering of the sulphur impurities in the gas. One system—that of Mr. Rew—of steaming horizontal retorts has lately been mentioned in our columns, and work is proceeding elsewhere on other lines. It is, however, a consistent tale of benefit that is told. As some engineers are satisfied that certain coals are best carbonized in horizontal retorts, and as the washing and grading of such coals, so as to adapt them better to continuous vertical working, is not yet a reality among our practices, the work that is proceeding with steaming charges in horizontals will have considerable interest. But of it all one can say—to employ the term introduced by Lord Moulton, and used by Mr. Duxbury in his article—it is good constructive work for the industry.

## Continued Flight of Coal Prices.

THE burdens of the times increase. Only a fortnight since we chronicled an advance of 2s. 6d. per ton in the war excess charge for coal on account of additional costs; and now the miners, who are virtually the coal controllers both in respect of output and price, having asked for a further increase of wages by 1s. 6d. per day for men and 9d. for boys, have obtained it, and so upon the former price of coal is clapped another 1s. 6d. per ton. This maks 10s. 6d. per ton standard excess upon pre-war prices for coal consumed in this country, and from collieries other than those in South Wales, Monmouthshire, and the Forest of Dean, in which areas the standard excess is now 13s. per ton. The Government Coal Controller on this occasion has succeeded in wrecking expectations. When a similar increase of wages to the miners was made last autumn, 2s. 6d. per ton was placed on the price of coal. The anticipation by outsiders was that, if 2s. 6d. was needed last autumn, it would again be required; but the Coal Controller has upset this theorizing by 1s. per ton. If 1s. 6d. is sufficient now, why was 2s. 6d. requisite last autumn? Perhaps the explanation is found in the "Iron and Coal Trades Review" article noticed in another editorial, which suggests that the Government has something in hand in the prices now being charged for coal. The 4s. advance of the past fortnight will mean another 4d. to 6d. on the price of gas in most districts; and we can see some companies now, in respect of dividends, being compelled to take refuge under the "Infinitesimal Relief" Bill, if it reaches the status of an Act of Parliament.

## Is the Present Pit-Head Price of Coal Justified?

THE Coal Controller will not be pleased with an editorial that appeared in the "Iron and Coal Trades Review" for June 28. After reading the article, the question crosses one's mind, Is the present pit-head price of coal justified? The only answer that the article will permit is, "It is not." Accepting the statements of our contemporary as authoritative (we see no reason for disputing or rejecting them), it would seem that, in part of the price now being charged, there is an excess which is due to a liberal interpretation of the Price of Coal (Limitation) Act, 1915; and to the making of this excess there is connivance on the part of Government representatives. To this excess the Government are (still putting the only interpretation we can upon the article) turning a blind eye, owing to the contribution it partially makes to national revenue. Another point may be added, and it is that under the Coal Mines Control Act the Treasury and Parliament are anxious that the Coal Control Department shall make the colliery business pay, despite additional costs. Some collieries have been able to pay large sums in excess profits; and to the lay mind it is difficult to see how these have been secured in view of the Limitation Act, and the declaration as to the necessity for making additions to the 4s. originally fixed as the *plus* figure over the basic price for specific coal under specific conditions.

According to the "Review," these profits appear to have arisen through the collieries evading the Act in determining the basis price for a given variety of coal. We cannot find any other construction that can be placed upon its words. Although the Act originally fixed 4s. as the standard advance, there was, our contemporary says, no actual basis in the way of a fixed average selling price to be adhered to; and "naturally collieries took full advantage—contending "they were entitled to this advance on whatever figure was "obtained, instead of being compelled to fix their standard "for each quality." On the other hand, where, owing to special circumstances and conditions of contracts, pit prices were below the average for any particular quality, "they "had no hesitation in bringing them up to the required "prices; and as buyers were entirely in the hands of sellers "in order to secure supplies, no great objections could be "made." This resulted in "the average selling prices "being *considerably higher* than in the strict sense the Act "allowed, had it been followed to the letter." In other words, the collieries took an unjustifiable course—they as sellers, and with the coal under their control, being in a stronger compelling position than the buyer. "It must be "remembered," adds the "Review," "that the bulk of these "extra profits has been taken by the Government, and "possibly on this account the letter of the Act has not been "too rigidly adhered to." In other words, the mighty British Government have, according to the article, been reaping advantage from an evasion of their own Act, and "possibly" have been winking at the evasion because it served their purpose. This is what we understand from the "Review," which certainly ought to know something about what has been going on; and it must take the blame for the disclosure.

## Co-Operative Tar Plants and Co-Operation with Distillers.

The Plymouth Gas Company are virtually pioneers in co-operative tar distillation, through the statutory powers possessed in relation to the gas undertakings in Devon and Cornwall. Those who read the interesting speech of Mr. J. H. Ellis, the Chairman, as reported last week, will have seen his statement that co-operation had shown that many economies can be, and have been, secured, and that the financial effect had been better for the gas undertakings concerned than the superseded system. He predicts, too, that there will be a very great future in this direction. These statements are founded on experience; and they are very significant. It is our duty to draw special attention to them, because co-operation between gas undertakings is the alternative to any attempt to perpetuate the old conditions under which the gas industry has smarted all too long. But we have an assurance that there is now good prospect of better relations being established with the tar distillers. We are glad to hear it, and hope there will be success. The distillers have now a more representative Association; and so there may be a better chance of coming to an acceptable agreement. If the gas industry extends its business as it is hoped it will do by rising to its opportunities, there will be more tar produced, and so plenty of room for excellent business with the tar distillers, and where, through distance or any other cause, it is preferable to have co-operative distilleries, these can also be arranged. There is one thing certain. It is that the gas industry must look after its own interests. There can be no place in the future for hesitation or weakness in pursuing the course that will best serve the gas undertakings and their customers for gas. Which will be that course in regard to tar the tar distillers have large power of determining. In saying this, they will recognize that it is only a commonsense businesslike attitude. There can be co-operation with distillers if they will, as well as co-operative tar-distilling plants.

## Mr. Curphey and Scientific Control.

As usual, the annual report of Mr. W. S. Curphey, the Chief Inspector under the Alkali Works Regulation Act, is full of technical interest; and there is much in it to spur on those who are in charge of the operations of gas undertakings. From his position, the Chief Inspector sees weaknesses that are perhaps not so obvious to men engaged day by day in the work, and who largely follow the dictation of custom in practice; and directly and indirectly in the report we find advice as to the necessity of scientific control in the various processes of gas-works. This was a strong point with Mr. Curphey a year ago; it is the same to-day. Reiteration will do no harm, not only in the gas industry but in the coke-oven industry, though such control is more difficult to obtain in these days of shortage of staff. But every engineer, in works not adequately equipped with scientific assistance, should make a mental note that this is one of the directions in which, to the best of his opportunity, there shall be strengthening as soon as possible. In works where a fully qualified chemist is not on the staff, it should be an indispensable condition henceforth that the engineer's or manager's assistant should have had a chemical training. In fact, every engineering assistant would be all the better equipped for work in the gas industry who has had such training; and there should in future be insistence on this.

## Points from the Report.

The report is studded with interesting matter. It is not astonishing to learn that of late ammoniacal liquors have been submitted to analyses which are of exceptional character, and that this has necessitated modifications in the methods of analysis. Gas chemists will look into this part of the report with considerable interest to ascertain the recommendations of the Chief Inspector. It is seen, too, that the use of nitre cake has somewhat extended, in part substitution of sulphuric acid, which shows either that objection to it is not so keen, or that cost and supplies of sulphuric acid have been impelling factors to the greater use of

nitre cake. The investigations, too, of Mr. P. Parrish at the South Metropolitan Gas Company's works [See "JOURNAL," Vol. CXXXVII., pp. 334, 345] may have assisted largely in the increased application. In connection with the production of ammonia expressed in terms of sulphate, there was a leap upwards in the United Kingdom of something like 25,000 tons in 1917 compared with 1916—458,617 tons, as against 433,703 tons. Of the increase, gas-works contributed nearly 16,000 tons, and coke-oven works came next with upwards of 7000 tons. The figures in Mr. Curphey's table show that in production gas-works are maintaining a good lead; being now ahead of the coke-ovens by about 22,000 tons. This advance in production has been obtained despite a number of antagonistic influences, which Mr. Curphey specifies. It is due, no doubt, to the larger demand for gas, the shortness of oil, and the appeal made in the national interests for the largest possible recovery in order to aid home food production. The Chief Inspector again devotes himself to experiences with the direct process of sulphate of ammonia manufacture; and as a commercial point for the industry, note will be made of his reference to the fact that in this country, as well as on the Continent and in America, increased production of ammonia from hydrogen and nitrogen is proceeding. This is a phase of our position in respect of sulphate of ammonia which should not be overlooked. Nevertheless, there must be no relaxation of effort. Future intensified competition will have to be met by economical production, which will enable sales to be made at competitive prices. Tar-distilling plants of the so-called dehydrating types are making numerical progress; but there is comment on a point which has more than once been emphasized in these columns, as to the insufficiency with many of them of condensing power. This is a pity, seeing that this deficiency means inefficiency in respect of the recovery of light oils.

## Gas and Housing after the War.

This is a matter that must be kept to the fore. The Ministry of Reconstruction and the Local Government Board are not allowing it to slip out of sight. If economy is to take its place in a housing scheme which will have to be carried out under the economical condition of dear materials, very strict consideration must be given to details that can contribute to a reduction of expense. This is where the gas industry should be able to step in and render help. The Advisory Housing Panel of the Ministry of Reconstruction have issued a Memorandum, in which they make various suggestions. Among these, they urge considerable financial aid on the part of the Government, in view of the certainty of high prices of materials after the war. Despite these high prices, it is immediately after the war that houses will be most needed, and therefore when a scheme of the kind must be hastened forward. It is suggested that local authorities should, for a period, act as the agents of the Government in connection with the temporary financial interest of the latter in the scheme. The Memorandum also proposes a higher standard of housing. In this connection, it is understood the President of the Local Government Board has arranged with the Royal Institute of British Architects to carry through a competition for a series of type plans. The rules of the competition, it is suggested, should be prepared with great care, and in co-operation with Sir Tudor Waller's Committee, to whom the question of economy in design has been referred. Gas can play an important part in economy in design; and the housing scheme should give a grand opportunity for demonstrating this. It is in the type plans that this should be done, although these, it is recommended, should be adapted to local needs by architects who know them.

## The Nitrate Half Year.

Inasmuch as since the control instituted by the British Government and the formation of the Allied Nitrate Executive at the end of last year all general dealings in nitrate have ceased on this side, any general review of the trade position is altogether out of the question. Importers have been carrying on their business as best they could with supplies already bought. Prices in Chili during the past six months have, say Messrs. W. Montgomery & Co., Ltd., in their half-yearly statement, varied considerably. At the beginning of the year business was done at from 12s. 3d. to 12s. 6d. per quintal; but towards the end of February 10s. 4d. and 10s. 8d. for ordinary and refined qualities respectively were accepted. Owing to the obduracy of producers and restraint on the part of the Nitrate Executive from making purchases, business proceeded slowly until the middle of May, when improvement was noticeable. Early in June, buyers and sellers both came to an understanding for the disposal of a considerable quantity at an advance of 1s. per quintal, which brought the existing rates to 12s. 6½d. and 13s. 0½d. per quintal for ordinary and refined qualities. In spite of circumstances, the production continues to be maintained, it is stated, at a figure which is well ahead of pre-war days; and reflection on this leads them to ask: If with the production of the German oficinas of about 400,000 tons per annum eliminated, pre-war figures can still be attained or exceeded, what will be the condition of the industry when war ceases, and with its cessation there is a practical stoppage of all abnormal demand for explosives and munitions of war? Also, it is pointed out, one must not forget to reckon with synthetic nitrate. That some considerable dislocation in the trade will take place when peace comes, is regarded as almost certain; and for a time Chilian producers may have to go through severe trials. But the hope is held out that, when tonnage once more becomes sufficiently plentiful to bring about a reduction in producing costs, and of sufficient volume to carry away the nitrate from Chili, a steadier market may follow.

## Coal and Coke Exports.

The exports of coal, coke, and patent fuel during May amounted to 3,050,735 tons—a reduction on the shipments of May last year of 614,088 tons, and of 774,652 tons on those for the corresponding month of 1916. Bearing in mind these reductions in quantity, the value of the shipments last month—£4,289,900—was £619,484 less than for May last year, and £500,560 less than for May, 1916. During the past five months, the exports totalled to 13,995,214 tons—a reduction of 1,800,089 tons on the like period of 1917, and 3,085,518 tons on the same period of 1916. The value of the fuel exports for the five months in the three years have been: 1918, £19,879,245; 1917, £20,963,021; 1916, £18,551,184.

## State Financing and the Electrical Scheme.

The "Financial Times" does not look very favourably on the scheme of the Board of Trade Electric Power Supply Committee. The war has given plenty of head to the dreamers of dreams in the way of social and industrial reorganization, to which dreamers the conflicting interests of company, local authority, railway, and tramway ownership of electrical enterprise do not look nearly so formidable as they did before the war. Our contemporary seems to have cast about, but has failed, to find some valid reason for the proposal that a national subsidy should be provided in one form or another, in order to counteract for the electricity industry the extra cost of construction work undertaken in the period immediately following the war, when costs may be abnormally high. The main objection that it finds is that the nation would be committed to the financial support of an organization which would in practice be entirely outside its powers of control, and which would spend money without stint on schemes as harebrained as the Loch Doon aerodrome without any more effective prevention than was exercised in that case. If all the prophesied good in the shape of economical production is to come out of concentrated electricity generation, then the financial position should be so secure that the additional expenses occasioned by higher costs should be well submerged by the economy. If the Committee have any real belief in the efficacy of their plans, it passes comprehension why they should pray for State assistance and special favour over other essential industries. The doubts of the "Financial Times" receive emphasis when it writes: "It is too early to say whether the national credit will after the war be in such a robust position as to be able to stand such extra burdens in addition to that of the war debt itself; but apart from that the question remains whether our actual experience of State socialism in war time has convinced the nation that it is so superior to private enterprise in the essential factors of initiative, prudence, and economy that it can safely and profitably be extended in the reconstruction period following peace."

Last evening—after the "JOURNAL" had been made up for press—the Gas Undertakings (Temporary Relief Bill) came before the House of Commons, was read a second time, and referred to a Committee of the Whole House.

## OBITUARY.

Mr. J. Allen Baker, who represented East Finsbury as a Liberal, was taken ill in the House of Commons last Tuesday night, and died in hospital a few hours later. He was a member of the London County Council from 1895 to 1906, and was one of the Select Committee who recently sat to consider the claims of gas companies to relief in connection with the financial hardships imposed upon them by the war.

News has been received of the death of Second Lieutenant Kenneth Douglas Handel, R.A.F., the youngest son of Mr. T. Handel, Manager and Secretary of the Ilminster Gas Company, who had for five years assisted his father at the gas-works. He joined the Forces in September, 1915, and went to France as a wireless operator attached to the Royal Flying Corps in May of the following year. In July, 1916, he was acting as wireless operator attached to a field battery, when the main wire of his apparatus was damaged by shell fire. He crawled into an exposed position to repair it, and had just done so when a shell burst near him, and he was severely wounded in several places. After his recovery, he acted as instructor at home in drilling and wireless work, until he gained a commission as pilot in the Royal Air Force. The first intimation of the event stated that he died on June 25. Lieutenant Handel was 25 years of age. A brother, Private Theo Handel, of the Australian Forces, is also serving in France; while another brother has been discharged as unfit.

## PERSONAL.

### RETIREMENT OF MR. DANIEL IRVING.

Much regret on account of the fact, and more especially its cause, will be felt throughout the gas industry on learning of the resignation, owing to health considerations, by Mr. Daniel Irving of his position as Chief Engineer to the Bristol Gas Company. The hope will be general that release from the cares of office—particularly heavy in these difficult days—will for years to come preserve Mr. Irving's health to himself and his personality to the profession with which he has so long been connected, and in which he is so greatly esteemed.

The step which Mr. Irving has, acting upon medical advice, been compelled to take, has naturally proved to him one of sore trial and pain; for he has been in the service of the Bristol Gas Company for the long period of thirty years. The resignation was considered at a special meeting of the Board of Directors last Wednesday, when there were naturally many expressions of sympathy and regret. He has done for the Company much good work—and work which, as he himself says, "has always been a real pleasure to me—especially during the past few years, the trying times notwithstanding." At the same time, his influence has been by no means confined to Bristol; for by participation in organized effort he has on all occasions done his best to forward the interests of the industry at large.

Along with all his other friends, we wish Mr. Irving many years of quiet life in which to enjoy his retirement.

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The Leeds City Council last week approved the appointment of Mr. Charles S. Shapley, of Southend-on-Sea, as Engineer and General Manager of the gas department, at £1000 a year, and of Mr. Charles H. Mitchell, Assistant Manager, at £500 a year.

Mr. T. A. Vanston, who has taken up an important appointment on war work, has been presented with a smoker's cabinet by the workmen and staff at the Bolton (Gas Street) Works. Mr. Vanston had filled the position of Superintendent at the Gas Street works for four-and-a-half years, and was previously for years Superintendent at the Lum Street Works.

Second-Lieutenant H. P. Lupton, R.G.A., who had been unconscious five days through concussion, and suffered from slight paralysis of the arm, but is now stated to be recovering, served his articles with the Burnley Corporation Gas Engineer (Mr. J. P. Leather), and was Junior Assistant Engineer. At the time of war breaking out, he had taken a scholarship at the Leeds University, and was studying gas engineering.

Mr. Mark Newsome, of Tyldesley, whose appointment as Engineer and Manager of the Chorley Corporation Gas-Works was briefly announced in last week's "Journal," received his early training at the Blackpool and the Leigh Gas-Works. He served two years in the drawing office of West's Gas Improvement Company, Ltd., Manchester, and was later transferred to the St. Helens Gas-Works during the original experiments on the first Glover-West vertical retort installation. Afterwards he was for a period of seven years engaged in the erection and working of such plants, and incidentally was entrusted with the installation and operation of the first Glover-West vertical retorts in the United States. He was appointed about two-and-a-quarter years ago to his present position as Engineer and Manager to the Tyldesley Gas and Water Departments.

## INSTITUTION OF GAS ENGINEERS.

### Minutes of the Council Meeting.

A Meeting of the Council of the Institution of Gas Engineers was held at the Central Hall, Westminster, last Friday week, the 28th ult.—the President (Mr. Samuel Glover) in the chair.

The announcement of the death of Mr. Thomas Berridge, of Leamington, Mr. James Braddock, of Radcliffe, and Mr. Charles Harrison, of Accrington, was received. Resolutions of regret and sympathy were passed.

The following names were approved for insertion in the next ballot-list: As candidates for the class of member, Mr. William T. Burton, of Leatherhead, Mr. Evan Rees, of Margam, Port Talbot, Mr. Frederick J. Robinson, of Chesham, Bucks., Mr. Alexander E. Whitcher, of Burgess Hill, and Mr. Frederick C. Willis, of North Shields. Mr. Sydney J. Oxer, of Mitcham, was approved for the class of associate member; while Mr. Harry H. Gracie, of Edinburgh, and Mr. Robert J. Meiklejohn, of Rugby, were transferred to the class of member.

Representatives on the National Gas Council for 1918-19 were appointed as follows: The President (Mr. S. Glover), the Vice-Presidents (Mr. Thomas Goulden and Mr. Thomas Hardie), three immediate Past-Presidents (Lord Moulton, Mr. A. E. Broadberry, and Mr. John Young), the Hon. Secretary (Mr. W. E. Price), Mr. H. Kendrick, and Mr. George Stevenson.

Other business considered had reference to the Engineering Training Organization, the Patents and Designs Bill, 1917, and the Training of Disabled Soldiers. Reports of the Finance and Emergency Committees were presented and adopted.

### Piling Coal for Storage.

Storage systems for coal formed the subject of a paper read by Prof. H. H. Stoek at a meeting in Chicago of the Western Society of Engineers. A number of different methods of storing were explained; and attention was given by the author to the piling of coal. He said that, in order to prevent spontaneous combustion, coal should be so piled that air can circulate through it freely, and thus carry off the heat due to oxidation of the carbon, or else it should be so closely piled that air cannot enter the pile and oxidize the fine coal. Stratification or segregation of fine and lump coal should be avoided, for an open stratum or a chimney of coarse lumps of coal gives a passage for air to enter and come in contact with fine coal, and thus to oxidize it and start combustion. Low piles are preferable, because the coal is more exposed to the air and better cooled than in high piles. If possible, the coal-pile should be divided by alley-ways, to facilitate rapid loading-out of the coal, in case of fire, so that the whole stock may not be endangered. The practice is not advised of providing just an occasional ventilation pipe, which is not much more than a place in which to insert a thermometer for the reading of temperatures. The plan of placing ventilating pipes close together has been tried in Canada, and is stated to have been effective. Unless there is an ample supply of water to thoroughly quench the fire, and cool the pile, it is very dangerous to add any water to a coal-pile. Coal of different varieties should not be mixed in storage, if it can be avoided; for one coal that has a greater susceptibility to spontaneous combustion than another may jeopardize the safety of coals that are not so liable to spontaneous combustion. The heating value of a coal as expressed in B.Th.U. is lessened very little by storage; but the coking properties of most coals seem to be decreased as a result of it. The deterioration of coal when stored under water is negligible; and such coal absorbs very little extra moisture. The best preventive of loss in coal storage is to regularly inspect the pile, and if heating occurs up to 150° Fahr. to keep close watch on it; and if the heating increases to 175° or 180° Fahr, to remove the coal as promptly as possible, and thoroughly cool it before piling again. It is important that coal in storage should be kept as much as possible from external sources of heating, because the susceptibility of coal to spontaneous combustion increases rapidly with rise of temperature.

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**Monazite Sands of Brazil.**—The Brazilian Government are publishing an edict for leasing the extraction and exportation of the monazite sands existing on the seashore and alluvial lands of the Union. The Brazilian Treasury Delegation, No. 20, Copthall Avenue, E.C., will receive proposals for this purpose until Aug. 6.

**Decrease in "T.N.T." Poisoning Cases.**—A great reduction has recently been noticed in the number of cases of poisoning among "T.N.T." workers. In the six months, October to March, 1916-17, there were 169 cases of serious illness; whereas in the corresponding six months of 1917-18 there were 42 cases. This result is due largely to a close medical supervision, combined with improved methods of working, and the substitution of mechanical processes wherever possible. The Minister of Munitions therefore has decided that the factory medical officers may permit continuous employment of persons upon "T.N.T." work. The effect of this will be a halving of the number of workers coming into actual contact with this explosive.

## STATUTORY UNDERTAKINGS (TEMPORARY INCREASE OF CHARGES) BILL.

THE following is the full text of the Bill, presented by Sir Albert Stanley (supported by Mr. Hayes Fisher and Mr. Wardle), "to enable the statutory provisions affecting the charges which may be made in respect of certain undertakings to be temporarily modified." The Bill was presented last Wednesday, and was on the paper for second reading last night.

MODIFICATIONS OF STATUTORY PROVISIONS AFFECTING CHARGES.

1.—(1) Where it appears to the appropriate Government Department that the financial position of any undertaking to which this Act applies has been adversely affected by circumstances arising out of the present war, the Department may, if they think fit, by Order provide for the modification of any statutory provisions regulating the charges to be made by the undertakers, and of any statutory provisions consequential on, or supplemental to, any such provision as aforesaid, for such period during the continuance of this Act, in such manner, and subject to such conditions, as appear to the Department to be just and reasonable:

Provided that—

(*a*) where the undertakers are a local authority no modification shall be authorized which will increase the statutory maximum charge by more than 50 p.ct., or which is more than sufficient so far as can be estimated to enable the undertaking to be carried on without loss; and

(*b*) in any other case no modification shall be authorized which is more than sufficient to enable a dividend on the ordinary stock or shares of the undertaking to be paid at half the standard or maximum rate of dividend, if any, prescribed for the undertaking, or at half the pre-war rate of dividend, whichever is lower.

(2) An application to a Department for the purposes of this Act shall be accompanied by such information, certified in such manner, as the Department may require with respect to the financial position of the undertaking in question.

(3) The undertakings to which this Act applies are tramway undertakings, including light railways constructed wholly or mainly on public roads, and undertakings for the supply of gas, water, and electricity.

(4) For the purposes of this Act—

The expression "statutory provisions" includes the provisions of any Order having the force of an Act;

The expression "appropriate Government Department" means, in relation to gas and water undertakings carried on by local authorities, the Local Government Board, and in relation to other undertakings the Board of Trade;

The expression "local authority" includes any commissioners, trustees, or other public body of persons carrying on otherwise than for the purposes of private profit, any undertaking to which this Act applies;

The expression "pre-war rate of dividend" means the average rate of dividend for the three financial years immediately preceding the war.

APPLICATION TO SCOTLAND AND IRELAND.

2.—In the application of this Act to Scotland the Secretary for Scotland, and in the application of this Act to Ireland the Local Government Board for Ireland, shall be substituted for the Local Government Board.

SHORT TITLE AND DURATION.

3.—(1) This Act may be cited as the Statutory Undertakings (Temporary Increase of Charges) Act, 1918.

(2) This Act shall have effect during the continuance of the present war and for a period of two years thereafter, and no longer.

## NATIONAL GAS COUNCIL.

AN Emergency Meeting of the Executive Committee was held on Friday last, at the offices of the Council, No. 39, Victoria Street. Among the subjects dealt with were the following.

A Special Sub-Committee has been appointed by the Council to consider the Household Fuel and Lighting Order, 1918, and the difficulties which will be likely to confront the gas industry in its application. A guide to the working of the Order for gas managers is in preparation by the Sub-Committee; and this will probably be published in the British Commercial Gas Association "Bulletin." The full text of the official Order with explanatory notes has not yet been issued.

The financial hardships question was dealt with, and the arrangements being carried out for obtaining the support of members of Parliament for the industry's case when the Government Bill comes up for second reading and for discussion at the Committee stage were approved.

Coke prices were considered.

Communications from the Council to the President of the Board of Trade and the Controller of Coal Mines were reported, protesting against the further increase in the price of coal, the injustice of applying this increase to arrears, and pointing out the shortage of stocks at the various works throughout the country and the commandeering of wagons by the railway companies in the Lancashire district. These matters were emphasized as bearing on the financial hardships of gas undertakings, and the total inadequacy to meet the situation of the so-called relief recommended by the Select Committee on Gas Undertakings (Statutory Prices).

A letter was read from the Ministry of Labour suggesting a conference on the question of the formation of Joint Industrial Councils. It was decided to refer this to the Special Committee who are dealing with the question.

A memorandum from the Employers' Parliamentary Council on the Trade Boards Bill, 1918, was also considered.

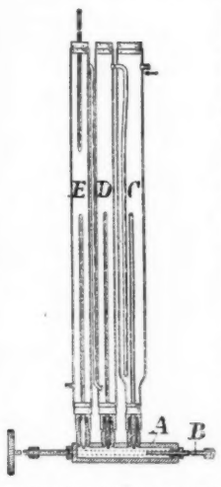
With regard to the Special Committee which was appointed some time ago by the Council to consider the relation of the gas industry to the national problem of the best utilization of the country's fuel resources, it was announced that valuable information and evidence of important expert witnesses had been recorded. A resolution was passed thanking the members of this Special Committee for their services, and for the very useful information which they had placed at the disposal of the Council. Active steps are being taken in connection with this matter; and these are at present engaging the close attention of the Institution of Gas Engineers and the Council.

## DETERMINING GAS COMPRESSIBILITY.

THE determination of the compressibility of natural gas is dealt with by Messrs. G. A. Burrell and I. W. Robertson, in Technical Paper No. 158, issued by the Bureau of Mines at Washington.

As a continuation of the work described in a previous publication of the Bureau of Mines, which presented the compressibility of the natural gas used in Pittsburgh, at pressures ranging from atmospheric up to 35·5 atmospheres, the paper shows the compressibility of three of the hydrocarbon gases (methane, ethane, and propane) that comprise natural gas, of carbon dioxide (another constituent of natural gas), and of natural gas from nine different cities. In addition, it contains analyses of natural gas from a number of cities, and presents a formula by which the compressibility of any natural gas can be determined from the analysis.

The methods used in preparing pure gases for compressibility determinations were as follows: Methane, fractional distillation of natural gas at low temperatures and pressures; ethane, electrolysis of sodium acetate; propane, action of propyl iodine on a zinc-copper couple; carbon dioxide, action of sulphuric acid on a solution of potassium bicarbonate. In preparing these gases, extreme care was used to rid them of all impurities. In every case, the final method of purification was fractional distillation at low temperatures and pressures.



**Apparatus for Determining the Compressibility of Gas.**

The apparatus with which the compressibility of the gases was determined is shown. The three capillary tubes E, D, and C, passed through stuffing-boxes into the chamber of the steel compression machine A. This chamber contained mercury; and by screwing the plunger B into the mercury, the latter could be forced into the glass capillary tubes, thereby compressing to the desired degree the gas contained therein. The capillary tube C held the gas whose compressibility was measured. The tubes D and E contained pure air, and served as air manometers (pressure-gauges). The pressure-volume curve for air had been determined during previous experiments; so that with any position of the mercury in the tubes D and E, the pressure of the air could be determined. The gas in the tube C was always under the same pressure as the air in the tubes D and E *plus* or *minus* the difference in height of the mercury columns in the air manometer and gas manometer. Therefore the pressure on the gas could be ascertained. The glass capillary tubes C, D, and E were 0·8 mm. inside diameter, with white backgrounds, and were graduated as purchased.

The compressibility of the gases was determined at a temperature of about 15° C. (59° Fahr.). Water in the water-jackets E, D, and C of the compression machine was kept at a constant temperature. No trouble was experienced in keeping the temperature within ± 0·3° of 15° C. during a determination that lasted not longer than one hour.

## ALKALI WORKS CHIEF INSPECTOR'S REPORT.

Once more there is a great deal of particular concern to the gas industry in the annual statement of Mr. W. S. Curphey, the Chief Inspector under the Alkali Works Regulation Act; consideration of the "direct" process of sulphate of ammonia manufacture in gas-works (which was extensively dealt with in the two preceding years) being resumed in the report for 1917, which was issued a few days ago.

The first instalment of what Mr. Curphey now has to say on this subject will be found on another page of this number of the "Journal;" and in addition to what is given there (and will be reproduced in subsequent issues), it may be stated that he goes fully into the question of the analysis of ammoniacal liquors. It seems that during the summer of last year, and the period that has since elapsed, liquors of exceptional character have been submitted for analysis; and this has necessitated revision of certain of the analytical methods. The results illustrate the difficulty of devising means for the analysis of ammoniacal liquors that are free from criticism. In the report, these results are considered under the headings of estimation of thiocyanate (sulphocyanide), estimation of cyanide in concentrated liquor, and estimation of polysulphide. As to the first, Mr. Curphey says it appears that lead carbonate is not a suitable reagent for removing sulphide from ammoniacal liquors containing cyanide, unless precautions are taken to exclude air during the operation. Even when cyanide is absent, the use of lead carbonate is not recommended, as the procedure entailed is lengthy, and prolonged washing with hot water is needed to extract the last traces of thiocyanate from the bulky precipitate of lead sulphide and carbonate. One is disposed, therefore, to revert to the earlier practice of boiling the liquor to expel sulphide and cyanide; due precaution being taken to minimize exposure of the solution to air until the expulsion is complete. This is readily effected by running the liquor into boiling water in a flask, in place of raising it to the boil. With reference to the second heading, hydrocyanic acid in ammoniacal liquor of ordinary strength is conveniently determined by means of Feld's method; but this is inapplicable for the analysis of liquor of high strength, as the amount of lead nitrate required to saturate the solution then becomes inconveniently great. The cyanide in such liquors is more conveniently determined by the polysulphide method, whereby cyanide is converted into thiocyanate by the action of ammonium polysulphide, and titrated with silver nitrate. The amount of thiocyanate and chloride pre-existing in the liquor is determined by a blank experiment and deducted. The section of the report dealing with the estimation of polysulphide will be found on p. 69 of to-day's issue.

The present report is the fifty-fourth of the series; and from it, again, are omitted the reports from the several districts which used to be included. The customary one to the Secretary for Scotland is, however, appended. In the period dealt with by the report, the number of registered works in England, Ireland, and Wales was 1414, in 65 of which the operations carried on brought them within the definition of alkali works. Compared with 1916, there was a decrease of one in the number registered as alkali works, and an increase of 22 in the number otherwise registered. There were also 168 works in Scotland registered under the Act, making an aggregate of 1582 for the United Kingdom. The number of separate processes of manufacture under inspection last year was 2326. This is an increase of 73 as compared with 1916. The increase was largely due to new units associated with the production of material required in the preparation of high explosives. There was a decrease of seven in the number of sulphate and muriate of ammonia works, and an increase of 44 in the tar works. The number of visits to works last year was 3304; of tests made, 3092. No proceedings were entered into for the recovery of penalties incurred through contravention of the provisions of the Act; but under other than war conditions, a different policy would very probably have been followed. In five works registrable processes of manufacture were found in operation in unregistered works; but it was decided to accept back fees, instead of taking proceedings.

The use of nitre cake in place of sulphuric acid was still further extended in 1917. At those works where sulphide ores of zinc were calcined, further progress was made in the utilization of the sulphurous gases evolved for the manufacture of sulphuric acid, though delays arose from the difficulty of obtaining the necessary material for construction, and from disappointment in the working of new mechanical calcining furnaces.

Coming to sulphate and muriate of ammonia and gas liquor works, it is stated that the number of registered works in this group continued to increase; and during the year 742 processes were under inspection, or 20 more than in 1916. The change from the manufacture of sulphate of ammonia to the production of concentrated liquor noted in previous reports made further progress. Several works ceased entirely the manufacture of sulphate; and in many others this process was greatly curtailed, to permit of the increased output of the alternative product. The increase of 20 just quoted was the net result of an increase of 27 works registered as gas liquor works, and a decrease of 7 works registered as sulphate of ammonia works.

Mr. Curphey goes on to say that the ammonia products manufactured from gas liquor were distinctly greater than in 1916.

*Amount of Ammonia Recovered in the United Kingdom (Expressed in Terms of Sulphate).*

| — | 1917. | 1916. | 1915. |
|---|---|---|---|
| | Tons. | Tons. | Tons. |
| Gas-works | 188,478 | 172,269 | 173,675 |
| Iron-works | 13,621 | 15,154 | 15,142 |
| Shale-works | 60,560 | 57,988 | 58,826 |
| Coke-oven works | 166,354 | 159,506 | 145,406 |
| Producer-gas and carbonizing works (bone and coal) | 29,604 | 28,786 | 33,218 |
| Total | 458,617 | 433,703 | 426,267 |

Numerous influences were in operation to bring about an opposite result. The inferior quality of coal used in many gas-works, the increased use of water gas to help the production of gas, the larger production of gas per ton of coal carbonized, the use of steam in vertical retorts, the gas liquor run to waste in many works owing to lack of the acid necessary to make sulphate, and the extended production of concentrated liquor with a too frequent higher working loss by this process, all tended to decrease output; while the only favourable influence, more than sufficiently powerful to counteract these adverse factors, was the active demand for gas which in many works called for the use of every unit of producing plant during the season of maximum consumption. In one works, the "direct" process was abandoned as unsatisfactory; but it was brought into more extended use elsewhere. The attention which has been given to the process clearly shows that in this, as in all chemical processes, scientific control is essential towards obtaining the best results.

At the close of the section alluded to in the first paragraph of this article, on the "direct" process of sulphate making, Mr. Curphey points out that chemical manufacturing methods for the production of ammonia from hydrogen and nitrogen are making rapid advances on the Continent, in the United Kingdom, and in the United States. Apart from "synthetic" methods for the production of ammonia, there is its recovery as a bye-product. A large proportion of the coal annually consumed is not so treated as to permit of ammonia recovery; so that, though 458,617 tons of sulphate were produced in 1917, there is room for a very large increase in this source of national wealth. A recent effort of some interest, says the report, is a fresh attempt to profitably produce products from the destructive distillation of coal at temperatures materially lower than are customary in present practice in gas-works, coke-oven works, or coal carbonizing works, where gas and coke are the dominant products aimed at. The period during which this fresh effort has been made is still too short for a final judgment. There are also indications of important changes in gas-works practice. The use of steam in vertical retorts will, judging from the long experience accumulated in the analagous methods of shale distillation in Scottish oil-works, materially increase the proportion of ammonia recovered per ton of coal; while the greatly increased volume of gas made will lessen the quantity of coal carbonized, unless a rapid and corresponding expansion in the demand for coal gas arises. More than the necessary expansion is, however, to be anticipated, as the convenience, varied applicability, and economy of a cheap heat-giving gas leads to its wider use by the industrial, as well as the domestic consumer. It would seem, therefore, he concludes, that ammonia supplies available from such varied sources will in the future prove to be ample for all requirements, even if the price becomes less than in the past.

### Tar-Works.

The number of tar-works registered was 360—an increase of 44 over 1916, which was almost entirely due to the erection of tar dehydrating plants in gas-works. Lack of sufficient condensing power was, Mr. Curphey remarks, again noted in some of the tar dehydrating plants, leading to loss of the light oils so greatly desired for high explosives. The complete fractional distillation of tar was effected in plant of the intermittent type. The system of continuous tar distillation introduced a number of years ago by Lennard remained in successful operation in a limited number of works.

*Quantity of Tar and Pitch in the United Kingdom.*

| | Tons. |
|---|---|
| Tar distilled in— | |
| Gas-works | 1,526,209 |
| Other works | 126,966 |
| Pitch produced in— | |
| Gas-works | 721,130 |
| Other works | 74,829 |

Mr. Curphey finishes with a few words upon scientific control. He says that, while Government Departments will doubtless be active in their proper spheres, "it is essential that there should not be lacking the solid foundation of skilled, alert, scientific control, combined with intelligent, sustained, and willing work on the part of everyone associated with individual works in the various branches of manufacture, as well as united effort on the part of the owners of these works. To elicit willing activity on the part of all by suitable recognition, is to lay the foundations of success in the coming strenuous competition among the nations."

### Figures for Scotland.

It is shown by the report to the Secretary for Scotland that the number of works registered was 168, or one more than in 1916.

The following statistics regarding the quantities of products obtained have been compiled.

*Products Obtained.*

| | | 1917. Tons. | 1916. Tons. |
|---|---|---|---|
| Salts of ammonia (expressed as sulphate)— | | | |
| Gas-works | 22,870 | | |
| Iron-works | 12,765 | | |
| Shale-works | 60,560 | | |
| Bone, producer gas, coke and carbonizing works | 22,232 | | |
| | | 118,427 | 114,693 |
| Tar distilled— | | | |
| Gas and coke-oven works | 142,969 | | |
| Other works | 119,189 | | |
| | | 262,158 | 265,482 |
| Pitch produced— | | | |
| Gas and coke-oven works | 66,914 | | |
| Other works | 70,098 | | |
| | | 137,012 | 146,153 |

Of the above total quantity of sulphate of ammonia, the equivalent of 17,689 tons was manufactured as concentrated ammoniacal liquor. The balance of 100,738 tons consisted of other ammonia products—sulphate, chloride, nitrate, &c.

As to sulphate and muriate of ammonia and gas liquor works, the number of this group registered increased by one. Four more works were registered as gas liquor works, and three fewer as sulphate of ammonia works. The question of cyanides in ammoniacal liquor come into serious prominence, owing to a fatality which was associated with plant for distilling such liquor produced in a coke-oven works, and also in a less degree to the severe corrosion of ironwork exposed to the waste gases coming from the treatment of such liquors. In this connection, Mr. Curphey says: "It is most desirable to provide, if possible, suitable means for dealing with the cyanides present in recently-produced ammoniacal liquor prior to its distillation. Some preliminary experiments made at the works in question have not led to successful results. But a practical solution of the matter is important; and I hope shortly to direct my attention to it."

## ELECTRICITY SUPPLY MEMORANDA.

FROM the report of the proceedings at the annual convention of the Incorporated Municipal Electrical Association, two or three things emerge which show that the members are far from being satisfied that there is going to be any immediate economical gain (which will reflect itself in the price of electricity) from the scheme outlined in the report of the Board of Trade Electric Power Committee; nor are super-stations ever likely to prove the economical suppliers that have been suggested. The report, however, commends itself more to the members, being municipal committeemen and officers, than that of the Sub-Committee of the Coal Conservation Committee, which went astray diplomatically by mercilessly attacking municipal engineering and administration. The municipal authorities infinitely prefer the Board of Trade report, because it really settles nothing, beyond the proposal as to the appointment of Central Commissioners and the District Boards; and it refers to them the defining of the lines of reorganization and development. It is clear that there is a large consensus of opinion that the super-station is not likely ever to be all that it was hoped to be. Faith has been nailed unconsciously by numerous advocates to a mass of impracticability, and immature ideas as to costs and results—transmission particularly, including losses *en route*. It is not by any means only a question of fuel costs, as Mr. S. E. Fedden, of Sheffield, showed at the meeting. Consider a super-station and a load of 100,000 KW. Some 5 or 6 million gallons of water an hour would be wanted, railway and handling accommodation would be needed for 2000 tons of coal a day, and there would be 50,000 or 60,000 tons of ashes to be dealt with per annum. Just think of the imposing water-works and railway sidings and mechanical handling plant for materials which would have to be constructed, as well as the enormous generating sets which would, through their very design and weightiness, heighten structural and maintenance costs.

**Losing Faith in Super-Stations.**

Anything, too—if anything—gained on fuel would be lost on distribution. This is a matter that has never been thoroughly threshed out. Mr. S. L. Pearce, of Manchester, has before made this point; and Mr. Fedden to a large extent confirms him. He has been looking into the question in connection with the supply of Sheffield. He does not think overhead transmission is likely to find favour in this country to any large extent, save for small loads, and that underground distribution will continue to prevail. For a 100,000 KW. station, with 66 p.ct. load factor (which he believes will come in the future), and 0·8 power factor, the cost of bulk supply at 11,000 volts one mile from the cooling tower station in Sheffield would be 0·275d. per unit; and with the power station ten miles away with 30,000 volts, and underground cable, the cost would be 0·274d. At 20 miles, with 30,000 volts, the cost would be 0·314d. Overhead cables, and 20 miles distance, at 30,000 volts, the cost would be 0·304d.; and at 30 miles, 40,000 volts (overhead), it would be 0·331d. Therefore, taking all considerations into account, Mr. Fedden has come to the conclusion that he could put down a power station near his main load (within an area of 4 or 5 miles), with cooling towers, and supply to his consumers at about 20 p.ct. less cost than he could do from an ideal station 30 or 40 miles away. Many electrical engineers are in agreement with him. There are other points. General approval is given to the idea that the big concerns, which are now supplying at a cheap rate, would suffer by having to take over a lot of smaller concerns highly capitalized, and with expensive distribution mains; and there are some broad-minded electrical engineers who are asking (as we have done) why should the electricity industry have State aid more than other industries supplying national requirements. This is an important point. There are a lot of small old-fashioned gas-works in the country that should be annexed by larger concerns, and distribution mains that should be enlarged; but no State aid is suggested for this beneficial work. All gas undertakings have had to bear their own financial burdens. When they take over a small works, they have to rely on economies and increased business for the justification of the absorption. Why should the electricity industry have preferential treatment over the gas industry? Mr. Pearce has noted that the "JOURNAL" has been making the point that preferential treatment for the electricity industry is suggested in the various Departmental reports in rather an astounding form; and no one seems inclined to rebut the allegation—simply because it stands out too conspicuously to be denied.

**Transmission Costs, and Other Points.**

An exceedingly interesting letter was received by the "Electrical Review" from Mr. A. S. L. Barnes, of Toronto, which shows, from the fuel-saving standpoint, there is no saving in fuel to be obtained by increasing the capacity of generating-stations beyond a certain level. He has obtained records from many stations in Canada and the United States; and a fuel curve which he has plotted, starts at a high point for small stations, and comes down rapidly as the size increases. But at a point representing a station capacity of about 75,000 KW., the curve is almost horizontal. This shows that in existing stations, the saving in coal consumption beyond this point up to a station capacity of 150,000 KW. is quite small, amounting to only about 7·5 p.ct. Between a station capacity of 125,000 KW. and 150,000 KW., the saving is only about 2 p.ct., and beyond the curve holds out no hope of further appreciable economies being obtained. Another curve indicates that load factor is more important than size of station. Economies in capital expenditure, operating costs, &c., may be made by large stations; and the gasification of coal and the obtaining of bye-products may, Mr. Barnes says, be more feasible at very large stations than in those of more moderate size. But he questions the wisdom of putting one's eggs into very few baskets.

**Fuel Consumption and Super-Stations.**

Electrical engineers should pay particular attention to certain comments that appear in the annual estimates of the Highways Committee of the London County Council. They refer to tram running and the reduction of coal consumption. The Government regulation specifies a reduction of 15 p.ct. in the consumption of coal. The method of achieving this without inflicting public disadvantage by reduction of the tram service has been, the Committee reports, by the partial substitution of coal by coke locally produced. In view of the fact that the tramways revenue has lately been £72,000 a week, the importance of maintaining the full services is apparent. This has been done by the aid of coke; and so coke has proved a benefactor to the London public and at the same time to the national interests which the Coal Controller's schemes are designed to serve. The method of adapting the chain-grate mechanical stokers to use coke is that referred to in the article that appeared on p. 331 of our issue for May 21. It is Mr. E. W. L. Nicol's double-feed hopper, which has, we know, been applied to quite a number of boilers at the Greenwich generating station. The electric light and tramway authorities at Bournemouth, Croydon, Leyton, Chiswick (London United Tramways), and the London Hydraulic Power Company have also derived advantage from the application of the system. Certainly they have felt that there is valuable safety in the ability to use coke.

**Coke Consumption and Coal Economy.**

The "Electrical Review" is very angry. It has just found out, although we referred to the matter some time since, that the Association of British Chemical Manufacturers have been successfully opposing the chemical clauses in the Bills of the Power Companies who this session asked Parliament for coal carbonizing and chemical product powers. For the Association to talk about the powers being unprecedented would, our contemporary thinks, even in normal times, have been an infallible sign of weakness and timidity; but in these unprecedented days it is a good deal worse. It also objects to one industry presuming to dictate to another as to what are its proper bounds and limits. The "Electrical Review" does not appear to know much about the history of this matter. How the non-statutory predecessors of the Chemical Manufacturers' Association—the Alkali Manufacturers' Association—with the view of

**Chemical Manufacturers Create Further Soreness.**

getting protection to exclusive purchasing on their own account, attacked the statutory gas industry's right to trade as it pleased in its own crude secondary products; how the gas industry fought tooth and nail over the matter of principle and liberty; how a Joint Committee of the two Houses was appointed, and reported in favour of the retention by the industry of the liberty to trade in its own products in the way that would yield it the utmost profit; how even then the influence of the chemical manufacturers was such that they succeeded in getting Select Committees and the Private Bill Authorities to place a limitation of one-third of an undertaking's own production as the measure of its total purchasing power from other undertakings, notwithstanding that it would result in economy to the gas industry and to the country to shorten railway journeys for crude products and to keep bye-product plants fully employed by larger concerns purchasing the produce of smaller neighbours. But regarding the dictation by one industry to another as to its proper bounds and limits, the "Review" should not forget that the electrical industry has before now strongly objected to gas undertakings—with their home-produced coke for steam-raising or gas for engine-driving—being invested with electricity powers where such did not exist or had not been exercised; and there have also been attempts to prevent gas undertakings obtaining the right to utilize their position to supply private gas-driven electricity plants, while, on the other hand, gas undertakings have had to put up with non-statutory firms supplying gas-producing plants to industrial customers for providing gas for both power and heating purposes. The "Review," however, regards the action of the Chemical Manufacturers' Association as "an extraordinary exhibition of short-sighted selfishness and petty tyranny;" and, finally, it considers it should be the business of some great national body to see fair play, and put a stop to unwarrantable interference and attempts to impose restraints of trade and limitations on legitimate enterprise.

**Waste in Electric Lighting.**

In connection with the rationing scheme, there is a great deal of waste of coal proceeding through the continued use of carbon filament lamps, and incidentally the revenue of electricity supply undertakings is fattened thereby. Carbon filament lamps will use (according to age and make) 3 to 5 watts per candle power, as compared with 1¼ watts with tungsten filament lamps. Mr. F. W. Wilcox estimates that there were in use in Great Britain in 1917, approximately 8 million carbon filament lamps, and that by substituting 30-watt tungsten lamps for 60-watt carbon filament lamps, there would have been obtained one-third more light, 500,000 tons of coal would have been saved, as well as £2,000,000 value of electric current. National necessity therefore calls for the substitution of carbon filament lamps by tungsten filament lamps, or, as bituminous coal is put to better use in gas-works than in electricity generating stations, by incandescent gas-lamps, preferably of the inverted type.

**Labour Wants a Finger in the Pie.**

It seems probable that before long we shall see a Bill presented for giving effect to the recommendations of the Board of Trade Electric Power Committee. Recently Sir Albert Stanley received a deputation from the Parliamentary Committee of the Trades Union Congress, for the purpose of discussing the recommendations of the Electric Power Committee. It seems that the trade unionists object to the election by large consumers of representatives on the Electricity District Boards. In their opinion, the control and generation of the supply of electricity should be in the hands of the public, and labour should be represented on the Electricity Commission as well as on the District Boards. If this view is accepted, what a scramble there will be among labour for the "job" of an Electricity Commissioner, with a salary of not less than £3000 a year, and an adequate pension! But is there a labour man with the needful qualifications for the job? However, the President of the Board of Trade pointed out to the deputation that the principle of State control was provided for in the scheme, and that the representatives of labour should receive due consideration when the Bill embodying the Committee's recommendations came to be drafted. The electricity industry will no doubt be highly gratified over the attentions of labour in the matter of assisting in looking after its affairs. The introduction of labour in national and local government has certainly helped to enliven debate.

**National Service!**

The unreliability of electricity supply has been again demonstrated, and the pity is in a manner which affected national war work. On June 4, for nearly three hours, there was a complete failure of the electricity supply at Sunderland, by which the local works and shipyards were seriously inconvenienced, and the tramway service had to be suspended. The trouble appears to have been caused in the boiler-house at the electricity station. In extenuation, it is stated that the department has been working under extreme difficulties owing to war pressure and conditions, and that a turbine which was to have been delivered last August is not yet in commission, while the sanction of the Ministry of Munitions to the installation of new boiler plant is still being anxiously awaited.

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Mr. John Okey Taylor, the late Chairman of the Reading Gas Company, who died at the age of 93, left estate of the gross value of £31,456.

## EXIT THE MAXIMUM PRICE.

By A Director of Several Gas Companies.

The principal part of the new capital issued by gas undertakings under the auction clauses was taken up at substantial premiums, in the belief that, in granting a maximum price with a sufficient margin as compared with current costs to cover all ordinary contingencies, Parliament had afforded a guarantee for the maximum dividends. Auctioneers had no hesitation in making a definite pronouncement to this effect. But over the last fifty years, the tendency on the part of the Government authorities has been in the direction of a steady reduction of this margin until it has nearly reached vanishing point, with the result that slow-going concerns who obtained parliamentary powers some forty years ago that allowed a price of gas sufficient to ensure maximum dividends with ease and every comfort, to-day enjoy an enormous advantage as compared with more active colleagues who have aimed at cheap gas and an enterprising policy, and, as a consequence, have been before Parliament at frequent intervals. Now this important guarantee, which has benefited the consumers more than anyone else, by enabling capital to be obtained at high premiums, is practically a dead-letter. A reasonable and fair provision for contingencies is a thing of the past, and relief is only obtainable to the extent of immediate needs, and that after a degree of delay that may necessitate a second application before the first is granted. If companies urgently in need of relief a year ago have not yet obtained it, what is their position to-day?

In view of the trouble, delay, and expense of an application for revision of the price clauses, any arrangement that meets the case and approaches justice and equity to all parties concerned must retain the margin for contingencies; and prompt consideration and decision must be assured. There has not been corresponding delay in raising the price of coal, or in restricting those of residuals; and there is no reason why applications for revision of existing obligations should not be treated with equal celerity.

Investors who have staked their capital on the faith that Acts of Parliament are inviolate, have recently had a rude awakening in more ways than one; but if the recommendations of the Committee on Financial Hardships, which is supposed to have had in view the relief of gas undertakings, which they admit to be seriously in need, is to pass into law, parliamentary protection will become not only a farce, but an incubus; and the burning question with the parties interested will be how to get rid of statutory obligations. As things are at present, many would be better off without the so-called monopoly that has cost them not only equivalent obligations, but much hard cash; and if the recommendations are accepted, anything in the way of progress in the future will be limited to non-statutory undertakings.

Like a tree that sheds its leaves, every industry is subject to loss of business; and the only means of maintaining vitality is by enterprise in the way of new trade. A stand-still business is almost a practical impossibility; in any case it cannot offer such good terms to its customers as one that enjoys full liberty to develop its resources. But how can a gas undertaking meet natural growth, to say nothing about new prospects that will open-up when the building trade can once more resume active operations, without additional capital? And how is it possible to raise money under the restriction that shares must not be sold at less than par, and a maximum interest of about 3 p.ct.? A more effective weapon could not have been devised if the main object in view was to handicap and prevent new capital issues.

If the idea of an equal apportionment of increased costs between buyer and seller had been generally adopted, the Committee would have some precedent for their proposal. But who, among the various industries represented on the expenditure side of the revenue account, has adopted an arrangement on this basis? At a moderate estimate, the whole of the burden due to increased costs of raising coal has been thrown on the user. Labour representatives have never proposed to accept even a small share in the increased costs of living. Metals and other-materials have advanced *pro ratâ* with the cost of production; also some establishment expenses. So the gas-works revenue account presents the remarkable spectacle of expenditure charged with probably more than the whole increased costs, while the income not only suffers from restricted prices, but is penalized to the extent of half the statutory dividend, and possibly more. Full dividends were not unanimous in the three years preceding the war. So far from being prosperous times, they were clouded by colliery and railway strikes. Many of the undertakings in small towns are conducted as consumers' companies. There is a good representation of consumers on the board of directors, and the importance of selling gas at a moderate price eclipses that of the maximum dividend. I know several who have been accustomed, since the date of formation, to be satisfied with 6 to 8 p.ct. in place of the 10 p.ct. allowed by Act or Order, and others are so situated that it is good policy to sacrifice dividend to selling price, to a moderate extent. Under the recommendations, these will all be penalized to the extent of the difference between the dividend actually paid and the maximum allowance.

It is instructive to compare the procedure at Westminster with that in the United States, and also with that in Australia, as revealed in the recent presidential address of Mr. A. Wilson, the Engineer of the Australian Gas Light Company. The experiences in these countries illustrate the unjust and incompetent nature of the recommendations now under consideration.

## CONSTRUCTIVE DISTILLATION.

### Tests with the "Dempster-Toogood" System of Continuous Verticals.

MUCH has been written regarding the results obtained by steaming continuous vertical retorts; but much more remains to be said, particularly as to cumulative experience with other systems of continuous vertical retorts, with variations, such as heating, coals, and the several gas-works conditions. Accordingly, we give, as succinctly as possible, the results obtained with, and reflections on, the "Dempster-Toogood" system of continuous vertical retorts, by Mr. Tim Duxbury, at the Central Gas-Works, Oldham.

Vertical retorts, generally speaking, have always been steamed to a greater or less extent; so that it was natural that the recent developments in this phase of continuous vertical retorting should slip under the descriptive title of steaming, thereby confusing with the steaming of the spent charge of intermittent vertical retorts. Such a designation, however, is inadequate; and, in order to perpetuate the beautifully balanced view-point of Lord Moulton's presidential address, "Constructive Distillation" should henceforth be used to designate this war child of the practice of continuous vertical retort carbonization.

In this system the retorts are 25 ft. 6 in. long; the heating gases being ignited some distance down from the top of the retort, combust, and burn downwardly. The products rising from the bottom flues of the retorts commingle to regenerate at the extreme top of the retort on the incoming cold coal. This method places the applied temperatures equally on each side of the retort at all levels. The installation was set to work in November, 1914; and the normal working conditions have all been strictly adhered to throughout these tests. As an example, the vacuum on the retorts is maintained as nearly as possible between ⅜-10th and 1-10th, the combustion flues are maintained at a good and safe bright orange, and no forcing for the purposes of the test has been in any way contemplated. Furthermore, the station meter was tested and certified by the makers. Throughout the tests the installation has worked with precisely the same staff as hitherto. The coal used throughout was good Yorkshire pea nuts, containing its quota of wartime matter. The coal-store being denuded of stocks, the consignments of coal from the eight current contracts were used indiscriminately as deliveries were received.

For purposes of comparison, the installation was rated and guaranteed in 1913 to produce 12,500 c.ft. per ton of coal, and 62,500 c.ft. per retort per diem. The results will show how much this has been exceeded.

Reflecting on the results, one must realize how aptly the title "constructive distillation" fits the process. Compared with the "inert" mass in the horizontal retort, the charge under this process in a continuous vertical retort "lives" and "moves."

With such a process, does not the carbonizer largely construct the conditions pertaining within the retort, whereby the chemical complexities partake more largely of his will? The external variants at his command are more numerous, as, for example, he governs the downward approach of the coal to the heat, he controls the heat as never before—even the length and taper of his retort now become factors determining the permeability and the capacity of his charge for water-gas production. His water gas, so formed within a closed retort (and continuously) is, in all probability, much superior in British thermal units to water gas made in the orthodox and intermittent manner of alternate blows and runs. Under this process the water gas has several functions to perform. For example, it acts as a scavenger to sweep-out and prevent the deterioration of the coal gas hydrocarbons, thereby maintaining the coal gas at the highest capacity for yielding liquid residuals and for the blending with diluent water gas. Furthermore, the water gas acts as a carrier and washes out the last traces of volatile matter from the centre of the mass of the charget whereby the yield of coal gas is greater when water gas is presen, than is practically possible when coal is distilled for gas alone. The cumulative effect is a very considerably improved process of distillation.

The results disclose the following: The yield per ton increases as the throughput per retort decreases. The steam admitted bears no proportion to the yield or output; rather does it appear that the smaller the throughout the hotter the coke and the greater the capacity for water gas production—there being a critical balance between the whole when the yield of British thermal units in the blended gas stands at the maximum. Thus the process is truly constructive.

In conclusion, so important is this constructive distillation in the aspect of coal conservation and allied national economies, that all continuous verticals should be maintained fully at work on the most suitable coals, and thereby assist our industry to be of still greater assistance to the country in its hour of need.

| Normal Working Results for March Quarter, 1918. | Weighed Tests each of Seven Days' Duration. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tons of coal constructively distilled, 5097 | 317 | 258 | 247 | 244 | 169 | 238 | 170 | 160 |
| Gas made per ton, c.ft. . . . . 15,804 | 19,177 | 19,837 | 18,028 | 19,119 | 22,017 | 18,800 | 21,312 | 23,521 |
| Calorific value (gross) . . . . 508 | 493 | 485 | 465 | 478 | 487 | 495 | 480 | 460 |
| B.Th.U. multiple per ton . . 8,028,000 | 9,424,000 | 9,620,000 | 8,383,000 | 9,138,000 | 10,722,000 | 9,306,000 | 10,229,000 | 10,819,000 |
| Tar, gallons per ton . . . . 14·15 | 23·5 | 17·6 | 8·58 | 13·3 | 15·74 | 19·5 | 17·17 | 17·70 |
| 10 oz. liquor (gallons) . . . . 30·66 | 41·0 | 32·4 | 34·2 | 31·7 | 42·1 | 26·9 | 29·6 | 28·2 |
| Coal throughput per retort, t. cwt. 4.12 | 3.12 | 3.12 | 3.19 | 3.12 | 3.4 | 3.16 | 3.6 | 3.12 |
| Gas made per retort, c.ft. . . . 72,696 | 69,073 | 71,413 | 71,214 | 68,828 | 74,454 | 71,440 | 70,279 | 84,675 |
| Steam pressure blowing through ⅜-in. dia. orifice, lbs. . . . 20 | 15 | 15 | 30 | 15 | 17 | 18 | 18 | 25* |

* The steam travelling a great distance from the boilers is very wet. In this test it was partially dried. The pipes are now being lagged and steps taken to dry the steam.

## CONSTITUENTS OF COAL TAR.

WE have received from Dr. Percy E. Spielmann, B.Sc., F.I.C., A.R.C.Sc., a copy of a pamphlet which he has prepared on behalf of the Department of Explosive Supply of the Ministry of Munitions of War for distribution by the Department. It has been written "to stimulate the interest of coal-tar distillers and refiners in the scientific details of the materials that they handle, and also in the lesser known substances which coal tar contains." But as it is likely to be of interest in a wider sphere, the Department have been good enough to place it at our disposal for publication in the columns of the "JOURNAL." We propose to take advantage of this permission, and to give a tolerably full abstract of its contents.

The pamphlet, which consists of 47 foolscap pages of typewritten matter, copied by a duplicating process, is entitled "Some Constituents of Coal Tar and their Properties." It is a translation, with additions and other modifications, by Dr. Percy E. Spielmann, of articles by Max Weger in the "Zeitschrift für angewandte Chemie" in 1909, on the "Rarer and Pure Preparations from Coal Tar" ("Uber seltenere und Reinpräparate aus Steinkohlenteer"). The pamphlet opens with a "Foreword" by Dr. Spielmann, and concludes with an index. We give the "Foreword" in full, and the remainder of the pamphlet in abstract. All temperatures are in centigrade degrees, and specific gravities, unless otherwise stated, are at 15·5° C. (60° Fahr.). In many cases, references to abstracts in English technical journals have been substituted for the references to German original papers given by Dr. Spielmann, merely for the convenience of readers to whom German literature is inaccessible.

#### FOREWORD.

The disastrous loss of a large proportion of the coal-tar industry from this country to Germany has led to a minute examination of the constituent substances of coal tar by the chemists of the latter country; and, incidentally, to a remarkable exhibition of that painstaking, meticulous, and, in the main, unimaginative character of work which is ordinarily associated with the German chemist. It must be acknowledged that the results obtained by these investigators have been of the greatest value.

It is to be hoped—indeed, it is fully expected—that in the immediate future detailed and difficult work of this kind will be carried on in this country. Our chemists are fully capable of such work; but in order that the best advantage should accrue to the country, there should be the stimulus of insistent demand from the coal-tar industry itself for detailed knowledge as to what exactly that industry is handling.

The present pamphlet has been prepared in order to give a general survey of the nature of the more valuable and also the lesser known substances obtainable by the distillation of coal tar.

References to German literature and patents have been retained, in order to serve as a guide to information which may not otherwise be very readily found. The almost complete omission of references to work done outside Germany is due to the desire that the present information should be circulated without further delay, more especially as British and other work is easily to be traced.

To do the subject justice, a volume should be written on it; but it is hoped that, while avoiding too many ordinary "text-book" facts, the information selected will be new to some and of service to many, and that a further and still more incisive interest, both scientific and industrial, will be aroused.

*Ministry of Munitions of War, D.E.S. Analytical Laboratory, Spring, 1918.*

#### SOME CONSTITUENTS OF COAL TAR AND THEIR PROPERTIES.

The 300 to 400 substances which have been found in coal tar—of which only about 150 have been estimated, and only 90 have been definitely isolated—can be divided into a number of classes

according to constitution and behaviour. These are, broadly, neutral bodies, acid oils, and basic substances. Each of these is characterized by the absence or presence of oxygen, sulphur, and nitrogen, which may form part of the aromatic ring, or be attached to it. Further, the fundamental ring may consist of a six-membered ring, exemplified by benzene, toluene, and pyridine, which may be multiplied, giving naphthalene, phenanthrene, truxene, and others; of a five-membered ring, represented by cyclopentadiene, thiophen, &c.; while a combination of the two—coumarone, hydrindene, &c.—is also to be found. The four-membered ring is not represented. A certain number of less important substances, many not of the aromatic class, may also be identified.

It is remarkable that out of the large number of substances present in tar, only four have been obtained pure on the large scale—viz., benzene, toluene, naphthalene, and phenol (carbolic acid); others of which large use is made are in the form of mixtures of homologues. Some of the sulphur, oxygen, and nitrogen compounds are left in the mixture of hydrocarbons in which they occur; but others are removed by further treatment—*e.g.*, acetone, coumarone, thiophen, nitriles, pyrrole, carbazole, &c.

For the isolation on the small scale of these constituents of coal tar, works' methods may be used; but the following reactions are also available: Sulphonation and re-crystallization of the sulphonic acids or their salts, followed by decomposition of the acids (Kelbe; J. Soc. Chem. Ind. 1886, p. 317) or their fractional decomposition (Raschig, German Patent No. 114 975); precipitation by means of picric acid and decomposition of the picrates (German Patent No. 53,792); polymerization and depolymerization; and recrystallization from organic solvents.

The six-membered ring hydrocarbons are best looked upon as being formed by the union of three $C_2H_2$ groups, each of which may be replaced by a $C_6H_4$ group. In reference to systematic nomenclature, the termination *-ene* is reserved for the chemically pure substance—*e.g.*, benzene, toluene, &c.; *-ole* for the commercial products—*e.g.*, benzole, toluole, &c.; *-ol* is used in German for both the pure and the commercial products. It leads to confusion. [Tri-nitro-*toluol* should never be used in English for T.N.T., which is tri-nitro-*toluene*. The commercial mixtures of aromatic hydrocarbons are, however, now more commonly spelt in English, benzol, toluol, &c., instead of benzole, toluole, &c., as proposed by Dr. Spielmann; and while there is the objection to this spelling that it suggests that they are alcohols and not hydrocarbons, it will be difficult to persuade technical men to revert to the older spelling which he advocates. The "Journal of the Society of Chemical Industry" dispenses with the final *e* in these words.—Ed. "G.J."]

### Benzene and Benzol.

*Benzene* having the formula $C_6H_6$, boiling point 80·3°, solidifying point 5·48°, and sp. gr. ·885, is obtainable from benzol by rectification, and washing with a small proportion of strong sulphuric acid in order to remove thiophen. It is seldom entirely free from paraffins.

*Benzol.*—The pure benzol of commerce, known as "crystallizable benzol"—sp. gr. ·884, boiling point 80·3° (average), and solidifying point 5°—contains thiophen and carbon bisulphide, as also some traces of toluene, paraffins, &c.

V. Meyer over-estimated the proportion of thiophen in benzol because his method of heating the benzol for six days with fuming nitric acid attacks the carbon bisulphide as well as the thiophen. Denigès estimated thiophen in benzol through the addition product which it forms with basic mercuric sulphate [J. Chem. Soc. 1895, A. i. p. 411; ii, pp. 332, 372; J. Soc. Chem. Ind., 1896, p. 746]; but the results are probably too high, as, according to Schwalbe, are also the results obtained by Dimroth's method, using mercuric acetate [J. Chem. Soc. 1902, A. i, p. 656]. Schwalbe uses a colorimetric comparison with mixtures in known proportions of pure benzene and pure thiophen. [J. Soc. Chem. Ind. 1905. pp. 271, 988]. Schwalbe's indophenin reaction (isatin and sulphuric acid) employed in this comparison, and the Liebermann's reagent (concentrated sulphuric acid containing nitrous acid) [J. Soc. Chem. Ind., 1888, p. 30], are used in qualitative testings of benzol for thiophen, which are commonly all that are carried out. The first reaction is considerably the sharper [J. Soc. Chem. Ind., 1904, p. 274], but see also Liebermann and Pieus [J. Soc. Chem. Ind. 1904, p. 763]. Benzol free from thiophen is a commercial product, obtained by thoroughly washing benzol with sulphuric acid.

The proportion of carbon bisulphide in "pure" benzol seldom reaches 0·2 p.ct. It can be removed through its reaction with ammonia to form the thiocyanate and sulphide, or with alcoholic potash to form the xanthate. The last-named reaction may be used for the estimation of bisulphide in benzol, by titrating with copper sulphate, which forms the insoluble copper xanthate; or the difference between the specific gravity of the benzol before and after extraction of the bisulphide may serve for its estimation. For many purposes the presence of carbon bisulphide is immaterial; but regard should be paid to its possible harmful effect when benzol is used as a solvent in chemical processes. "Commercially pure" benzol is used for the manufacture of the mono- and di-nitro benzenes, employed as such or after reduction (to aniline), and of the mono- and di-sulphonic acids, from which phenol and resorcin are produced synthetically.

Benzol, 90 p.ct., is a mixture of benzene with about 15 to 20 p.ct. of toluene and some xylene. It is used as a solvent in industry, and as a motor-fuel and carburetting agent. "Standard" benzol, of which 95 p.ct. distils at 90°, and not more than 7 p.ct. below 80°, is a grade required in war conditions. It contains 7 p.ct. of toluene. Benzol, toluol, and xylol are useful for the separation of water from other substances, as in the determination of water in tar, &c. S. Young has used benzol in the industrial preparation of absolute alcohol [J. Soc. Chem. Ind., 1902, p. 721, and German patent No. 142,502].

*Toluene* ($C_6H_5CH_3$), boils at 110·8°, freezes at −92·4°, and has a specific gravity of ·872. It is obtained from toluol in the same way as benzene from benzol.

*Toluol.* The "commercially pure" toluol boils at about 110·8°, freezes at about −90°, and has a specific gravity of about ·870. It contains some traces of benzene, xylene, paraffins, and thiotolen (methylthiophen). Laubenheimer's reaction is best applied in the following manner for the detection of thiotolen in toluene. Into a cylinder containing 10 c.c. of the toluene, 3 c.c. of concentrated solution of phenanthraquinone in glacial acetic acid is poured, 1·5 c.c. of strong sulphuric acid is added, and the cylinder is shaken gently for some time under a stream of cooling water. If a green colour appears, thiotolen is probably present, and for confirmation the contents are diluted with 3·5 c.c. of water, cooling the while. The top layer is then removed, and the lower (acid) layer is shaken out with an equal volume or more of ether. If thiotolen is present, the upper ether layer will acquire the colour of bluish red wine. No appreciable heating must occur during the test. Toluene free from thiotolen is an industrial product. Toluene is employed for the manufacture of the explosive, tri-nitro-toluene (T.N.T.), of toluidine, benzyl chloride, benzaldehyde, saccharin, &c., and in the synthesis of indigo.

*Xylene* ($C_6H_4(CH_3)_2$) is in three isomeric forms—viz., ortho-xylene, sp. gr. 0 8682, boiling at 142° to 143°, and melting at − 28° to − 28·5°; meta-xylene, sp. gr. ·8691, boiling at 139°, and melting at − 54·8°; and para-xylene, sp. gr. ·8661, boiling at 138·5°, and melting at 15° C. The coal-tar product contains the isomers in the following proportions: Ortho, 10 to 16 p.ct.; meta, 70 to 75 p.ct.; and para, 20 to 25 p.ct.

*Xylol* has an average specific gravity of ·866, and boils at 138° to 143°. It contains about 60 p.ct. of meta-xylene, 10 to 25 p.ct. of ortho- and para-xylene, some ethyl benzene, and small proportions of trimethyl benzene, paraffins, and thioxen (dimethyl-thiophen). Xylol is used in the manufacture of nitro-xylene, and for removing naphthalene stoppages. The three xylenes may be separated through the formation of their sulphonic acids, whereby meta-xylene is easily obtained. Paraxylene is separated through its solidification at 15°. An indication of the approximate composition of xylol can be obtained by its conversion into the xylidines; but this is not a generally applicable method for the determination of the three isomers. Levinstein's method depending on meta-xylene not being attacked by dilute nitric acid, and para-xylene not being attacked by concentrated sulphuric acid [J. Soc. Chem. Ind., 1884, p. 77] has been shown to be innacurate by A. Reuter [J. Soc. Chem. Ind., 1884, p. 626; 1889, p. 874]. Presence of para-xylene can be detected by treating xylol, &c., with a small proportion of bromine, whereby the para-xylene bromide is thrown down first on cooling. [Radziszewsky and Wispek, 1885; but the method can be made to give more exact results than they obtained.]

### Other Hydrocarbons of the Benzene Series.

The following tabular statement (Table I.) of the chief physical properties of a number of homologues of benzene, &c., has been prepared from the data given in Dr. Spielmann's paper.

*Ethyl Benzene.*—This occurs in very small quantity in tar, and is not easily prepared from it, but is prepared synthetically from bromo-benzene, ethyl bromide, and sodium. It was discovered

**Table I.**

| Hydrocarbon. | Formula. | Specific Gravity. | Melting Point. | Boiling Point. |
|---|---|---|---|---|
| Ethyl benzene | $C_6H_5 \cdot C_2H_5$ | 0·872 (15·5°) | .. | 137° |
| Tri-methyl benzenes | $C_6H_3(CH_3)_3$ | | | |
| Mesitylene | $C_6H_3(CH_3)_3$ (1 : 3 : 5) | 0·865 (15°) | .. | 164·5° |
| Hemellithene | $C_6H_3(CH_3)_3$ (1 : 2 : 3) | 0·901 (15°) | .. | 175° |
| Pseudocumene | $C_6H_3(CH_3)_3$ (1 : 2 : 4) | 0·888 (15°) | .. | 169·8° |
| Cumene | $C_6H_5 \cdot CH(CH_3)_2$ | 0·8587 (0°) | .. | 152·5°–153° |
| Cymene | $CH_3 \cdot C_6H_4 \cdot CH(CH_3)_2$ | 0·8723 (0°) | .. | 175* |
| Durene | $C_6H_2(CH_3)_4$ [1 : 2 : 4 : 5] | .. | 80°–81° | 196° |
| Diphenyl | $(C_6H_5)_2$ | 1·165 | 70°–71° | 254° |
| Styrene | $C_6H_5 \cdot CH : CH_2$ | 0·907 (15°) | .. | 144°–145° |

by Nölting and Palmar in commercial xylol [see J. Soc. Chem. Ind. 1891, p. 912].

SOLVENT NAPHTHA.

The three tri-methyl-benzenes all occur in the solvent naphtha fraction of coal tar; pseudocumene being the most abundant, and the most easily obtained in the pure state on account of the more sparing solubility of its sulphonic acid in sulphuric acid. The two grades of solvent naphtha which contain these compounds, as well as cumene and durene, distil 90 p.ct. up to 160° and 90 p.ct. up to 175°, and are used industrially in chemical cleaning, varnish making, and linoleum manufacture. Plehn has proposed to add from 5 to 30 p.ct. of solvent naphtha to alcohol in order to make a substitute for ordinary lamp oil [J. Soc. Chem. Ind. 1905, p. 80]. G. Schultz prepares "safety explosives" by direct nitration of solvent naphtha or fractions derived from it [Eng. Pat. 19,565 of 1907; J. Soc. Chem. Ind. 1908, p. 421]. Commercially, smell is more important than traces of chemical impurities as a criterion of the value of solvent naphtha; but its behaviour to the sulphuric acid test is also of moment. Some of its constituents—especially the unsaturated hydrocarbons—are subject to auto-oxidation by atmospheric oxygen, which affects the more nearly saturated bodies to an appreciable, though less, degree. Acids, which may be extracted, are formed by auto-oxidation if the naphtha, &c., is exposed to the air and light [M. Weger, J. Soc. Chem. Ind. 1903, p. 322].

*(To be continued.)*

## "ELECTRICIAN" BLUE BOOK AND TABLES.

THE thirty-sixth year of publication of the "Electrical Trades' Directory and Handbook" has come round. It is one of the enterprises of the "Electrician;" and is now under the control of Messrs. Benn Bros. War conditions and paper restrictions have had a health-giving effect upon the volume. It has been somewhat reduced in bulk, which makes it more manageable. The diminution has been partly attained by expurgating from it material which was of minor importance, and some which, in respect of gas, was not only antiquated, but was incorrect through the inadequacy of knowledge at the time of birth. A handbook to be of value must be reliable; and now from a general examination of the pages—without attempting to devote the rest of one's life to the checking of the data—one can say the volume has been improved, that the editor has aimed at attaining a high degree of accuracy, and that the mass of information supplied in it is cheap at 15s. Technical data of a miscellaneous but valuable character are found early in the book. There is a digest of the laws relating to electricity supply, and the wiring rules of various authorities are given. Brief particulars are furnished of some of the Committees appointed by Governmental Departments to make investigation into special subjects. Telegraphy has a section, and so have institutions, universities, colleges, and technical schools. There is a bulk supply of directory matter referring to both home and abroad; and, in order that it shall not suffer incompleteness, it includes names in which electrical men are interested even though their owners have only a position on the extreme limits of electrical activity.

Anyone who has the Directory should have "The 'Electrician' Annual Tables of British and Foreign Electricity Undertakings." They are supplementary to the Directory; and only cost 5s. Bound in handy form, reference is easy. So far as the British statistics are concerned, the information is in most instances up to April 30 this year. The columns referring to fuel charges, and prices of electricity and gas tell a tale of the times through which we are passing.

## COLLECTION OF GAS ACCOUNTS.

By A. CANNING WILLIAMS.

IN the "JOURNAL" for the 2nd inst. [*ante*, p. 20], expressions of opinion are invited as to the substitution of half-yearly for quarterly collections. It is one of those questions which are largely determined by local conditions. The inhabitants of towns of a residential character would probably prefer to pay their gas bills half-yearly, while in places where the bulk of the population are wage or small salary earners, who have to map-out their incomes with considerable care, and like to meet their liabilities at short intervals, the quarterly system would be favoured.

But why not strike the golden mean by rendering three accounts per annum—one for the six months covering the summer and autumn, one for the winter quarter, and one for the spring quarter? This method has been in use in Edinburgh and Leith (and some other towns in Scotland) for many years; and I can testify to its efficacy and convenience.

The following statement (from which is excluded gas used by prepayment consumers, public lamps and stair-lights, and gas supplied in bulk) shows that the plan of dividing the year into the three periods named gives in Edinburgh and Leith fairly equal results in the matter of consumption:

| Year. | Summer and Autumn Half-Year. (April-May to Oct.-Nov.) | | Winter Quarter. (Oct.-Nov. to Jan.-Feb.) | | Spring Quarter. Jan.-Feb. to April-May. | |
|---|---|---|---|---|---|---|
| | C.Ft. in Millions. | Per Cent. on Annual Consumption. | C.Ft. in Millions. | Per Cent. on Annual Consumption. | C.Ft. in Millions. | Per Cent. on Annual Consumption. |
| 1915–16 | 681 | 38 | 623 | 35 | 478 | 27 |
| 1916–17 | 634 | 37 | 610 | 36 | 459 | 27 |
| 1917–18 | 680 | 38 | 628 | 35 | 480 | 27 |

It is true that in the colder climate of Scotland gas cooking is not employed as extensively as it is in England, where in many towns as much gas is consumed by householders in the summer and autumn months as in the remainder of the year. In such places, the long term could be adjusted to suit the locality.

The Edinburgh Corporation Electricity Department divides the year into three parts of four-and-a-half, five-and-a-half, and three months respectively—the last-named covering the period from October to January. After all, there is no special virtue in a quarter of a year; and in these days, when we are all economists and (if not too thickly crusted-over with ancient precedents and old habits) reformers, changes can be made without the old-time risk of meeting with opposition—on principle or otherwise.

One of the advantages of the three-term system, as arranged in Edinburgh, is that the work in the Financial Department is at its lowest in the months of July, August, and September. This permits of the taking of holidays, and the writing-up of new gas ledgers, &c., with the minimum of inconvenience. In fact, overtime and unseemly rushes under high pressure are practically unknown. Let me adduce proof of this falling-away of the work; for there are those to whom nothing is so convincing as figures;

| Month Ended (1917–18). | Number of Payments Received. |
|---|---|
| June 15 | 43,524 |
| July ,, | 21,076 |
| Aug. ,, | 9,020 |
| Sept. ,, | 9,456 |
| Oct. ,, | 15,167 |
| Nov. ,, | 45,797 |
| Dec. ,, | 38,801 |
| Jan. ,, | 16,099 |
| Feb. ,, | 39,863 |
| Mar. ,, | 37,809 |
| Apl. ,, | 26,223 |
| May ,, | 41,539 |

As regards the monetary aspect of the matter, we find that cash usually runs short in September and October; but matters are put right with the bank by taking temporary loans at ½ or 1 p.ct. above the rate allowed by the Scottish banks for money placed on deposit, which is at present 3 p.ct.

I have not discussed the question of rendering annual accounts, because it is not a feasible one. How would the undertaking be financed without a large addition to working capital? How would it suit the public—their pockets, and their desire (an increasing one) to exercise control over consumption? And what would the office staff do during the greater part of the year?

### The Coal Position in America.

The United States Fuel Administration, in co-operation with the Director General of Railroads, announced, as from April 1 last, a zone system to govern the distribution of bituminous coal. Instead of, as hitherto, coal being distributed practically without regard to the distance between the mine and the consumer, under the zone system the idea is to avoid as far as possible waste of transportation facilities, consistent with the maintenance of the greatest production and a proper coal supply to all users. It is said to have been found that cars and locomotives had been occupied for many unnecessary days in hauling coal hundreds of unnecessary miles, in order to deliver it at places that are much more accessible to other fields, from which coal could be obtained with far less tax on the transportation energies of the country. The situation with which the administration had to grapple was one of great complexity; and the plan decided upon provides for elasticity through a system of special permits issued by them when necessary. As only one indication of the saving to be effected by the system, it is calculated that it will eliminate the movement of more than 2,000,000 tons of Pocahontas coal to Chicago and other western points, over a haul of about 660 miles. Chicago can obtain this tonnage of coal—under the new system must obtain most of it—from Southern Illinois mines, with an average haul of 312 miles. Allowing for the differences in quality of the two coals, it is estimated that there will thus be saved 11,400,000 car-miles, which will permit fourteen additional round trips of twenty days each from West Virginia mines to zone destinations, allowing an extra production of at least 700,000 tons of Pocahontas coal. Proportional savings will result in other directions. Under regulations of the Fuel Administrator, coal of particular quality or characteristics for a special purpose may be moved by permit beyond the limits imposed by the zone system, where a supply is not available within the zone. Coal for transport on inland waterways is not affected by the new regulations.

# THE "DIRECT" PROCESS OF SULPHATE MAKING IN GAS-WORKS.

**From the Annual Report of Mr. W. S. Curphey, the Chief Alkali Inspector.**

In his reports for the years 1915 and 1916, Mr. W. S. Curphey (the Chief Inspector under the Alkali Works Regulation Act, 1906) dealt at great length with the subject of the "direct" process for the manufacture of sulphate of ammonia; and, in his report just issued for 1917, he gives much further information of an important character on the same question. The inquiry was instituted with the idea of ascertaining the directions in which improvement might be looked for through the adoption by gas-works of the "direct" process, both with respect to more regular working of the purifiers and a higher yield of sulphate. The previously published portions of Mr. Curphey's reports referring to the matter will be found in numbers of the "JOURNAL" issued in September, 1916 [p. 606], and August, 1917 [pp. 281, 322, 372]. In this and subsequent numbers it is proposed to reproduce the further statement on the same matter which appears in the 1917 report.

Attention in 1915 was directed mainly to determine the cause of the periods of disorganization to which the oxide purifiers were subject in certain works where the "direct" process was in use—works, many of them, well conducted in respect of other operations. Samples of spent oxide were submitted to analysis, and comparative data presented of the working of various representative types of plant. The subject was further fully discussed theoretically in its chemical and physical aspects, and conclusions drawn as to the conditions best suited to maintain the purifying material at its highest state of efficiency. In 1916, investigation concerned itself mainly with an attempt to define more closely the condition for maximum efficiency in purifier working, to determine the cause of the relatively low yield of ammonia in the "direct" process, and to devise means for the prevention of loss. With the willing and able co-operation of the management, the operation of plant at two representative works was kept under close observation, temperature records were taken and recorded graphically, effluent spent liquors analyzed, the ammonia content of the crude gas entering and leaving the bubbler and rotary washer studied under varied conditions of working, and further comparative data collected relating to the condition of the purifiers during periods of both good and bad working. Evidence was adduced, based on quantitative test, that serious loss of ammonia was taking place in the effluent spent liquors at many of the works, and that under certain conditions absorption of ammonia in the bubbler is very imperfect. Suggestions were made for the addition to the latter of what was termed a "neutralizing box" of special design, which was subsequently adopted with very happy results at one of the two works above referred to. Finally, a number of preliminary experiments were carried out in a small model purifier, to determine the efficiency of hydrated oxide of iron under conditions varied as regards temperature and hydration—experiments which clearly established the importance of temperature and degree of humidity as factors controlling efficiency in oxide purification.

The conclusion of the work in 1916 still found one faced with the fact that the yield of sulphate in the "direct" process remained low, when judged by relative standards, even at works where every effort was made to reduce working losses at the purifiers, storage tanks, and ammonia still to a minimum. One was led to ask, therefore, Are we justified in expecting a recovery figure of 28 to 30 lbs. of sulphate of ammonia per ton of coal carbonized, in the absence of reliable data respecting the actual production of ammonia at the retorts? Preliminary test certainly indicated that such a recovery figure is by no means a standard universally applicable. Attention in 1917, therefore, was mainly directed to the systematic collection of data relating to the yield of ammonia from the retorts under varying seasonal conditions. Incidentally, this involved the determining of retort-bench temperatures by a Féry optical pyrometer, and a still closer control of working losses.

### WORKS TESTS.

The Department is again indebted to the management at "Works E" and "G" (referred to last year) for valued co-operation in systematic research; and in addition recognition is due to the management at "Works H" for equally disinterested help. The attention of the management of all the works where the "direct" process is in operation has frequently been drawn to the importance of keeping a close watch on the effluent spent liquor from the still, where serious losses are apt to occur if working conditions in respect to liquor feed, liming, and steam are not strictly regulated. Experiment shows that the ammonia still in the "direct" process is by no means the secondary source of supply that was once imagined. Attention was early directed to the probability of effecting a saving of steam at the still by utilizing the Liebig condenser as preheater where the still is of the continuous type. It is due to the management to state that a preheater of this design was independently adopted at "Works H," and has been in use for the past six months with excellent results. Its adoption at other works is now under consideration. Further experience of the working of the "neutralizing box" at "Works G" [see "JOURNAL," Aug. 28, 1917, p. 373] fully justifies expectations; and at "Works H," where a similar box has recently been installed, equally satisfactory results have been obtained. Control of purifier temperatures by means of thermometers, inserted into the oxide on the various grids is still practised at "Works E" and "G;" and the advantage of maintaining the temperature of the oxide by steam-pipes suitably placed within the purifiers has been fully demonstrated. It is important, however, in this connection to note that steam-pipes are subject to rapid corrosion if exposed to the action of spent oxide or of condensed liquor; and if steam-pipes are placed within the purifier, care should be taken when selecting material, and the pipes should also be protected from contact with oxide and from liquor draining from above.

### *Ammonia in Oxide Purification.*

The part played by ammonia in oxide purification was fully discussed in earlier reports. Further experience confirms the conclusion previously reached, that a regulated supply of ammonia is essential to efficient purifier working in the "direct" process, especially during the colder months, when the boxes are working at full load. One is disposed to attribute much of the irregularity of working during the colder weather to the free absorption of ammonia by the relatively wet oxide, and its conversion into fixed salts—thiocyanate (sulphocyanide) and sulphate. When oxide fouls during such periods of disorganization, it is usually found to possess an acid reaction, and to contain marked traces of soluble ferrous salts; and the free use of the ammonia bye-pass has often enabled a foul box to clear itself, if a suitable temperature be maintained.

It was suggested last year that better control of ammonia to the boxes might be effected if it were possible to admit a supply of gas separately to each of the various layers in amount controlled by a simple qualitative test. Separate admission of ammonia is, no doubt, a refinement of working hardly possible in ordinary practice; but, undoubtedly, a qualitative test applied to the gases leaving the first and second boxes is a desideratum. Such test has been in regular use at "Works E" and "G," and has afforded valuable guidance to the managements on critical occasions. The gas is sampled by means of thermometer tubes, and is allowed to impinge on a strip of moistened litmus paper held close to the cock. Experience shows that, with the purifiers working normally, the gas leaving the first box imparts a decided blue colour to the paper on twenty to thirty seconds exposure; that leaving the second box, a faint trace only or none.

### *Loss at the Bubbler.*

During the year, attention was directed to a source of loss at the bubbler, which, though small in absolute amount, is by no means negligible considered in relation to weight of coal carbonized, and in a process where multiplied small losses may be serious in their cumulative effect. The loss here referred to is due to the periodic removal of tarry scum from the surface of liquor in the bubbler effluent tank. Such scum is predominantly arsenical in works where arsenical acid is fed to the bubbler; in other works it is predominantly tarry. In some works it is the practice to return this acid product to the tar and liquor well; in others it is thrown away. Neither practice is to be recommended. If returned to the well, the free acid and sulphate increase the proportion of "fixed" ammonia in the liquor, with consequential increased consumption of lime at the still, and the tar in the well becomes contaminated with an acid arsenical tar that may be a source of trouble to distillers. If thrown away, the whole of the accompanying sulphate and free acid is lost. It would appear to be better to steam the scum, with or without addtion of water, and to pour the liquor on to a breeze filter draining to the bubbler effluent tank or other suitable receiver. When the scum is highly charged with tar, separation can often be readily effected by addition of hot water, followed by stirring. The tar sinks, and the supernatant liquor can then be decanted. At "Works G" it was found that some 90 to 100 lbs. of scum, containing 40 lbs. of sulphate of ammonia, were being thrown away per week, amounting on occasions to more than ¼ lb. of sulphate per ton of coal carbonized. The whole of this scum is now treated, and the recovered sulphate returned to the bubbler.

### *Protecting Liquor.*

It is well, perhaps, to point out that figures for the recovery of sulphate are of little value in comparative statistics, unless based on careful measurement of stocks accompanied by an analysis of liquors; and even then results are misleading if stocks vary widely from one period to another, since it is obvious that the whole of the ammonia in stock cannot be recovered in actual practice owing to working losses in the handling and distillation of liquor,

and in the storage tanks. This is especially true of the "direct" process, which is generally conducted at works of small size, where little regard is often paid to the importance of protecting liquor from evaporation of ammonia during storage, and where losses at the still are sometimes serious. At one works, the loss of ammonia in the spent effluent liquor is rarely below the equivalent of ½ lb. of sulphate of ammonia per ton of coal; at another the average loss at the still (as determined by analysis) averaged 1¾ lbs. of sulphate of ammonia per ton of coal for 28 days, and for the four following days averaged 3¼ lbs.—and this at a time when the still was under observation, and daily samples taken. Account should be taken also of any ammoniacal liquor retained by the tar—an amount by no means insignificant in works where separation of tar and liquor is imperfect. The importance of covering in sealpots by sliding lids and of protecting liquor during storage have been frequently emphasized.

*The "Rotation" System.*

In 1915, attention was directed to the advantage of working purifiers on the "rotation" system, coupled with the downward flow of gases; and the matter was again referred to in 1916. The management at "Works E" and "G" have had the matter under consideration; and arrangements are being made to effect the necessary changes in purifier connections to admit of downward flow of gas, as soon as conditions are favourable. At "Works E," it is proposed to insert special connecting channels within the boxes to reverse the direction of flow. At "Works G," the functions of the inlet and exit mains to the purifiers are to be reversed by means of a secondary main with the necessary valves.

The recovery figure for sulphate in the "direct" process undoubtedly leaves much to be desired. As already stated, when the process first came under observation the relatively poor yield of sulphate was attributed solely to working losses. Investigation now shows that this view is untenable, and that improvement, if such is to be attained, must, in the better conducted works, be sought for rather in the carbonizing house than in the bubbler.

*(To be continued.)*

## ESTIMATION OF POLYSULPHIDE.

Dealing with the analysis of ammoniacal liquors in his report for 1917, Mr. W. S. Curphey, the Chief Inspector under the Alkali Works Regulation Act, makes the following remarks on the estimation of polysulphide.

The estimation of polysulphide in ammoniacal liquors has received little attention hitherto in this laboratory, as the liquors submitted to analysis have generally been free from that constituent; cyanide being present in excess. But in 1917 attention was directed to the matter by the occurrence at a sulphate of ammonia works of repeated blockage of the still from deposited sulphur—a not unusual trouble at works where "oxidized" liquors are dealt with. As the matter appeared to be one of general interest, special inquiry was made into the conditions of manufacture at the works in question; and a sample of the liquor distilled was obtained and submitted to analysis. The composition of the liquor indicated that it was unusally rich in sulphur compounds, and in a highly "oxidized" condition. Upon boiling it, a heavy deposit of free sulphur and tarry matter was obtained, indicating that polysulphide was present in unusual amount. The presence of polysulphide in ammoniacal liquors, and its reaction with ammonium cyanide to form thiocyanate, was fully discussed in the annual report for 1905. It was there shown that when a liquor containing ammonium cyanide and sulphide is exposed to air, progressive formation of thiocyanate takes place; the polysulphide formed from the ammonium sulphide by oxidization being at once converted into thiocyanate by the cyanide present. In its simplest form, the reaction may be considered to proceed on the lines of equation:

$$(NH_4)_2S.S + NH_4Cy = (NH_4)_2S + NH_4CyS.$$

Cyanide and polysulphide react, therefore, to form thiocyanate; and an excess of either body implies absence of the other. This fact accounts for the absence of polysulphide from gas-works and coke-oven liquors when freshly collected and protected from exposure to air. It would appear to be desirable, therefore, if the presence of unstable polysulphide is to be avoided, to protect the ammoniacal liquor during circulation or storage from undue contact with air. The protective effect of a layer of oil in minimizing the loss of "free" ammonia and in restricting the formation of "fixed" salts was noted in the report for 1915. In special cases, doubtless, relief might be obtained by the suitable blending of liquors; a liquor rich in cyanide being added to one rich in polysulphide before distillation. On the other hand, ammonium cyanide is a constituent of ammoniacal liquors by no means welcomed in many works—more especially in liquor concentrating works—as volatile cyanide compounds are extremely destructive of ironwork.

Relief might be sought in gas-works practice (where liquors are circulated to bring them up to strength) by admitting the air used to effect concurrent aeration of oxide in the purifiers at more than one point, in such a way as to effect oxidation of the ammonium sulphide under controlled conditions, thus converting the cyanide into thiocyanate without much exceeding the equivalent of polysulphide. It is of interest to note that at the gas-works referred to above, where the presence of an excessive amount of polysulphide in the liquor was a chronic source of trouble at the still, the whole of the air needed for concurrent aeration was admitted at a point prior to a vertical washer on which the liquor was circulated. Since the attention of the management was directed to the ill-effect of over-aeration on the liquor, the air has been diverted to a later point in the scrubbing system; and the trouble has now ceased.

With respect to the estimation of polysulphide in ammoniacal liquors, a considerable amount of time has been devoted to the elaboration of a simple method of analysis, but with only partial success. Three methods were tried:

1.—The liquor is mixed with excess of a solution of ammonium cyanide of known strength in a stoppered bottle or flask, and the excess of cyanide remaining after conversion of the polysulphide into thiocyanate determined by distillation.

2.—The liquor is treated as above; but in this case the thiocyanate formed is determined. The thiocynate equivalant of the polysulphide present is then obtained by deducting from the total thiocyanate figure the amount of thiocyanate originally present in the liquor, separately determined.

3.—The liquor is slightly acidified with hydrochloric acid, neutralized with ammonium carbonate, warmed to promote coagulation of the separated sulphur and tarry matter, and the precipitate collected on a Gooch crucible, dried, and weighed. The proportion of sulphur present in the impure product is then determined by precipitation as barium sulphate after oxidation.

None of these methods is free from criticism. Methods Nos. 1 and 2 are subject to interference from dissolved oxygen, as already stated, which, unless excluded, causes the polysulphide figure to exceed its proper value. In Method No. 3, sulpho-compounds of a tarry nature are apt to be precipitated conjointly with the sulphur and yield sulphate on oxidation with fuming nitric acid or sodium peroxide. Of the three methods, No. 2 appears to offer the most advantages.

## VOLUME OF GAS IN HIGH-PRESSURE TANKS.

Mr. J. M. Spitzglass, of Chicago, replying to a query in the American "Gas Institute News," says the amount of gas contained in a given receptacle or tank is determined from the characteristic equation:

$$\frac{P_0V_0}{T_0} = \frac{P_1V_1}{T_1} = \frac{PV}{T}$$

in which P represents the absolute pressure of the gas (in cases where the gas is saturated with water vapour, P represents the partial pressure of the gas) or pounds gauge *plus* 14·7; V represents the specific volume of the gas, or the volume of the tank under consideration; T represents the absolute temperature of the gas, or 460 *plus* the temperature on the Fahrenheit scale.

It is customary to assign the subscript "0" for the standard pressure and temperature condition, which is 14·7 lbs. per sq. in. and 60° Fahr., or 460 *plus* 60 equals 520° absolute. Accordingly, $V_0$ is the volume in standard cubic feet. This reduces the equation to the form of:

$$\frac{14{\cdot}7\ V_0}{520} = \frac{PV}{T}$$

Therefore—

$$V_0 = \frac{520}{14{\cdot}7} \times \frac{P}{T} V$$

$$= 35{\cdot}38 \frac{P}{T} V$$

In this case, $V_0$ is the desired volume in standard cubic feet, and P and T the absolute pressure and temperature in the tank respectively.

If the temperature of the gas does not differ materially from the standard or basic temperature at which the gas is being sold, this factor is eliminated and the formula is reduced to:

$$14{\cdot}7\ V_0 = PV$$

Therefore—

$$V_0 = \frac{P}{14{\cdot}7} V$$

or the amount of gas in standard cubic feet is equal to the actual volume of the tank multiplied by the ratio of the absolute pressure in the tank to the standard pressure of 1 atmosphere. In some European countries, pressure-gauges have dials graduated in atmospheres. The reading of such a gauge indicates directly the volume factor of high-pressure gas.

**High Explosives.**—There has been received from Messrs. Crosby Lockwood & Son, of Stationers' Hall Court, E.C., for review, a copy of a practical treatise on "High Explosives," the cash price of which is £3 3s. net. The author is Captain E. de W. S. Colver, Dr.Met., F.C.S., A.I.A.E., of the King's Own (Yorks. L.I.), attached to the Ministry of Munitions of War, who was formerly Research Demonstrator in the University of Sheffield. Opportunity will be taken to notice the treatise at greater length; but meanwhile it may be mentioned that it is a fully illustrated book, consisting of some 800 pages, and is divided into 53 chapters and four appendices.

# CORRESPONDENCE.

*[We are not responsible for opinions expressed by Correspondents.]*

## Leadership or New Blood.—Sliding-Scale and New Economic Conditions.

Sir,—Without presuming to deny or support your assertion of June 25, that the gas industry lacks strong leadership, one wonders whether there may be others who imagine that an infusion of new blood in the more influential councils of the industry might not be a good thing. Why should the gas industry whine for relief like a cripple at a gate? It seems likely to get more kicks than halfpence that way. To be unfortunate may be good policy for a widow. Of that I am no judge; but for an industry powerful, progressive, whose aid was essential to the stopping of Germany's rush over Europe, according to Lord Moulton, and which has a just claim, to beg for relief! Well, as an insignificant member of the industry, I beg leave to protest.

And why should the industry tie itself to the existing sliding-scale? The economic era in which it may have served a useful purpose has passed, and may never return. [It may be noted, however, that, even in that period, the company which sold gas at the lowest price was not a sliding-scale one.] When, under the play of practically unrestricted economic forces, abnormal increases in the price of its raw materials of manufacture took place, these were compensated for sooner or later by increases in the prices of residual products; and the price of gas was comparatively little affected. But now a new economical "Order" has been inaugurated to which the existing form of sliding-scale is totally unsuited, and in which such sliding-scale can only work injustice to those who have been so unfortunate as to invest their money on the strength of a "parliamentary bargain" in a public utility undertaking. Nothing can hide the fact that the "law" of supply and demand is not immutable; for it has been altered by legislation, and that not only in relation to coal.

Nearly all the products of gas manufacture are controlled adversely to the interests of gas undertakings; while its raw material, coal, is directly, and most other materials necessary for gas production are indirectly, so controlled. The New South Wales principle applied to the sliding-scale might make it suitable to the new conditions; perhaps as long as they last. But the sliding-scale as it is! Still more as the Select Committee would "relieve" it!

What seems to be wanted badly is leadership, convinced that the gas industry has as much natural right as any and every other industry to pass on increased charges due to the rise in prices of raw material and manufacturing costs over which it has no control, and that the denial of such right is injustice. To diminish this claim by talk of quasi-monopoly and the rest of it, seems very like foolishness in face of what the Government have done in the case of coal mines and railways. Have they no monopoly? Yet they pass on costs, and have Government aid in doing so. Moreover, they are public-utility undertakings.

It may well be that the "Financial Times" has discerned the true cause of the Select Committee's report. If so, indeed whether or not, sending such letters as the National Gas Council advise to members of Parliament will not, in my opinion, have any great effect. A press campaign, well conducted, even in these days of the Daily "Hack" might yet be efficacious, even if it had to be done by paid advertisement.

J. Kelly.

*Bridlington, July 7, 1918.*

## Organization of the Gas Industry.

Sir,—As you indicate in your issue of the 2nd inst., in your article "America Leads," the time has arrived, and the absolute necessity has been shown, for "the formation of a comprehensive organization of all gas interests, to take up the work of the gas industry as it should be taken up."

This organization should, however, divide itself into two parts—that is, municipal and private or dividend-paying undertakings. In fact, the report of the Select Committee on Gas Bills seems thus to make a division or distinction, in so far as municipal undertakings are to be allowed to increase the price of gas to such an amount as will cover costs, which one naturally concludes means manufacturing charges *plus* interest on capital outlays and sinking funds. They can thus turn over any increase on to the consumer and ratepayer, and have really no incentive to economy.

How different the treatment of private undertakings. They are to have no relief until their dividend goes below one-half of the standard. This means that, where sliding-scale company shares of £10 were taken up (as many were) at, say, £18 on a 7 p.ct. standard dividend, no relief is to be given until the yield is under 2 p.ct. actual or less present income-tax £1 8s. p.ct. In this case, there is no power to turn over to the consumer (who is also ratepayer) any increased cost except—and especially in the case of sliding-scale companies—at the expense of the shareholder.

One point that might well come before such an organization is the inequalities of the standard sliding-scale rates. One company has a standard of 2s. 6d., and another equally well-situated in every way with a standard of 3s. 4d. or more per 1000 c.ft. The fact is that some companies have in the past been thus penalized for good and economical management.

The interests of these two classes of undertakings are thus shown to be distinct, and there ought to be separate organisations for each.

The recently-formed Scottish Gas Council is a case in point. Of the members, fully one-half represent municipal undertakings, and the Chairman, Vice-Chairman, and Secretary—in fact, all the office-bearers—represent such undertakings, which really cannot be said to have exactly a community of interest with private companies. I, therefore, hold with you, Sir, that the getting together of such an organization as you indicate (but divided as I have shown to be expedient, considering the different circumstances) is essential, and the sooner the better.

There are plenty of energetic and able men in the industry to take this up, and bring it to a successful issue. Preferably, I should say an organization for each of the different parts of England and Wales and one (or at most two) for Scotland, who could formulate schemes and then consider them as a body when necessary—such body to consist of one or two representatives from each district organization.

Trusting to hear more of this,

Ell.

*July 4, 1918.*

## A Development Committee for the Gas Industry.

Sir,—I congratulate you upon the important article in the last issue of the "Journal," on the question of a vigorous Development Committee for the gas industry; and I hope you will not allow this matter to rest.

You have evidently taken the right view of this question; and the sooner pressure is brought to bear on the formation of a Committee of this kind, the better it will be for the gas industry.

I am quite sure that no man is better fitted to lead the movement than Sir Arthur Duckham.

Geo. Clark,
Managing-Director, Bryan Donkin Company, Ltd.

*Chesterfield, July 3, 1918.*

## The New Fuel Order.

Sir,—Yesterday's daily papers gave varying extracts from the Order, which will be most confusing to the public—*e.g.*, "The Globe" gave a table and stated, "that it showed at a glance the amount of coal and light householders are free to use." But it did not state that the fuel allowance may be converted into gas or electricity; and the public reading such a statement will naturally assume that the quantity of gas named in the notice is all that they may use. In "The Times," "Daily Telegraph," and other papers, very long statements were given, and similar tables to the one appearing in "The Globe." In these instances it is stated (but not near to the tables), that gas may be taken in place of coal.

It is, I think, common knowledge that, previous to the publication of the Order, many of its proposals were known. On several occasions, I urged that the coal, gas, and electric ration should be printed in the Order under one heading, and in terms of tons of coal, with a clear footnote explaining that the coal ration could be converted into gas or electricity, or both. It will be necessary for gas companies to very carefully instruct their consumers with regard to the new Order; but much work would have been saved, and less confusion caused, if the suggestion which I made had been adopted.

If consumers obey the Order in the sense in which I feel sure the majority will read it, there will be an enormous reduction in gas consumption, unless further steps are taken to make it clear that gas in excess of the lighting ration may be taken in place of coal.

*Reading, July 4, 1918.* D. H. Helps.

## First to Introduce, and First to Withdraw.

Sir,—I sent you a letter a few weeks ago (which you kindly published) in which I ventured to suggest that part of the blame for what has occurred in the matter of relief to gas companies should be awarded to those who went behind the National Gas Council and introduced relief clauses in Bills of their own, while the Board of Trade had the matter under consideration. I understand that two of these companies were the South Metropolitan Gas Company and the South Suburban Gas Company, and that they have now withdrawn the clauses from their Bills. The starters are the first to retire—possibly to save the rest of the provisions in their Bills. But holders of gas capital in other companies will have their own views regarding the active manœuvres of these companies first and last.

*June 6, 1918.* Stockholder.

[Explanation was made last week (p. 10) as to the reasons that lead the South Suburban Gas Company to withdraw the clauses, and doubtless much the same reasons apply in the case of the South Metropolitan Company.—Ed. "G. J."]

## Price of Coke Breeze.

Sir,—I have sold a large quantity of coke breeze to-day at a reasonable price, and was told by the purchaser that a neighbouring gas engineer could sell his breeze at 11s. per ton less.

What, in the name of common sense and common trading, is the good of holding "Commercial Smokers" every month if gas engineers will not study the value of their products?

*July 6, 1918.* "Billy Keene."

## A Vision.

Sir,—The Gas Manager had been laying down his views on the military situation to his slightly bored better-half, who had reminded him, in an innocently tentative way, that her own views had been expressed years ago, and evidently were proving to be correct.

The Gas Manager was always roused by reminders of this kind; and by eloquent use of voice, spoon, fork, and knife, the latter in martial array on the dinner table, conclusively proved—at least, to his own triumphant satisfaction—that the Allies could, and would, drive the enemy out of Belgium and France by a skilfully executed flank movement on the right—that is, in the direction of the salt cellar and pepperpot, supported on the left by a brilliantly conceived fleet action, which would first take effect in the neighbourhood of the sauceboat.

He droned on, with evident somniferous effect upon his patient hearer, and was conscious all the time of the splendidly logical effort he was making. Surely Ludendorff, and even the Kaiser himself, would realize the hopelessness of their position, if they could hear his merciless argument; and they would at once bow to the Nemesis his words were exposing to their gaze.

The winged words flew on, when the Manager was startled by a reverberating knock on the door. A messenger appeared from the works, bearing a letter with the superscription "O.H.M.S. Board of Fate. Immediate and urgent." He hastily seized it, and read the enclosure. He was informed, under Ref. No. LLP/1023/E.G.S./62½/P16, that, in view of the apparent ease with which gas managers were filling up and promptly returning the numerous returns, statements, estimates, and pure guesses which Government Departments were requiring from them, it was proposed in the future to send weekly notices from the Aqueduct Hotel of regular rises in the price of—the letter here appeared to be blurred—of 3s. 11d. per ton, and thereby to avoid upsetting the regular, though possibly monotonous, routine heretofore obtaining in gas-works throughout the kingdom (Ireland, the Isle of Man, and Lundy Island would be dealt with in a separate notice). Lastly, no acknowledgment need be sent of the receipt of this communication. The signature was the well-known one of "Kismet."

With a sigh of profound relief, the Gas Manager rose to his feet and proceeded to his office. Here he drafted a circular-letter to the consumers of his company, informing them of the beneficent mercy of the Powers that Be towards himself and his perspiring staff, at the same time notifying them of an immediate increase in the price of gas, to be followed by regular increases week by week to meet the increased cost of —— he paused in his writing. "How should he put it?" he cogitated. Why were these regular increases required? Did he really know himself? Was Kismet really ——? Then again what were to be the increases? What about residuals? Could he, dare he, budget for any help in that direction?

He thought on and on, regardless of time, until a well-known voice sounded close at his side: "You poor tired dear, you've slept soundly while the table was being cleared. It's really time for you to be back at the works." With a sigh full of regret that the Vision vouchsafed to him was after all but a dream, the Gas Manager slowly waked to the stern realities of life, and pensively left the house, meaning to spend a busy afternoon in finding how much ingot and pig lead he had inadvertently accumulated in the preceding month. NEMINE.

*July* 6, 1918.

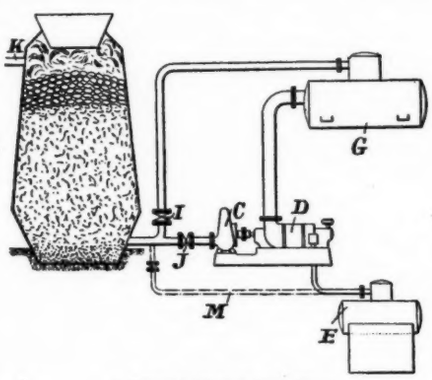
# REGISTER OF PATENTS.

## Production of Water Gas.—No. 112,942.

SOCIÉTÉ D'EXPLOITATION DES APPAREILS RATEAU, of Paris.

No. 1114; Jan. 19, 1918. Convention date, Jan. 24, 1917.

In the usual type of water-gas plant, comprising a plurality of gas-producing units, it has been proposed (the patentees remark) to use the exhaust from the steam-engine driving the air-blast producing fan or blower for generating gas in the units which for the time being are not being "blown;" but in such plant it is necessary to run at least one steam-engine continuously to provide the steam required to be passed through the generator during the gas production stage of the process. The object of the present invention is to obviate this necessity by employing a steam accumulator adapted to be connected to the exhaust pipe of the steam-engine, or to the pipe for leading the steam to the gas-generator, so that steam may be supplied to the generator during the gas production stage of the process when the steam-engine is stopped.




**A French Water-Gas Plant.**

One method of arranging the apparatus is diagrammatically shown, in which a centrifugal blower is driven by a steam-turbine.

The producer is connected to the fan C driven by the steam-turbine D, which is supplied by the boiler E, and exhausts into a steam accumulator G or into a gasholder. The accumulator is connected to the blast pipe of the producer.

At the commencement of a run, the fan blows air into the producer for (say) three minutes, the cock J being open. The generated gas, containing a large amount of nitrogen, is discharged into the atmosphere through a pipe K, or is delivered to any apparatus in which it is to be utilized. During this period the turbine D exhausts into the accumulator G, where it is stored—the cock I being closed. At the end of this period, the cock J is closed and I is opened. The accumulator thereupon ceases to receive exhaust steam from the turbine; on the contrary, the accumulator now supplies steam to the producer, with the result that water gas is generated. At the end of (say) four minutes, the cock I is again closed, and the fan is set running by admitting steam to the turbine again for three minutes, and so on. Normal working is thus established.

To guard against any possible deficiency of exhaust steam, a pipe M is provided to supply expanded steam direct from the boiler to the producer. A pipe (not shown) may also be provided to deliver expanded steam from the boiler to the accumulator.

## Obtaining Motor Fuels and Light Paraffin Oils from Shale and Benzene, Toluene, and Solvent Naphtha from Coal.—No. 115,573.

JUSTICE, P. M.; a communication from S. G. PIRANI, of Melbourne.

No. 13,485; Sept. 19, 1917.

As a means of modifying the nature of the hydrocarbons produced in low-temperature destructive distillation of coal or shale, the patentee points out that it has been proposed to mix the latter with finely-ground limestone, or other suitable carbonate that acts as a basic substance; it has also been proposed to heat in a retort to a high temperature carbonaceous matter mixed with divided iron and the like in the presence of steam.

The present invention consists essentially in mixing the shale or coal in the form of coarse powder, both with some finely-ground material (such as limestone, dolomite, carbonate of magnesium, or barium carbonate), which, under the action of heat, will give off carbonic acid gas, and with small iron-scrap (such as iron turnings), or its chemical equivalent, for the purpose of causing the release of increased quantities of hydrogen. On the mixture being subjected to heat in a retort, the carbonic acid given off acts as a carrier for the hydrocarbon vapours evolved from the shale or coal, and prevents them becoming permanently fixed gases; while the action of the iron scrap increases the volume of hydrocarbon vapours given off in the retort.

In preparing the mixture, the coal or shale and the carbonic acid producing material are reduced to powder—the more finely pulverized the better. It is found that the most convenient and economical practice is to grind the coal or shale so that it passes through a mesh of 64 to the inch, and the carbonic acid producing material through a mesh of 400 to the inch. The proportions of the latter material and the scrap iron vary according to the amount of oxygen contained in the shale or coal. With shale or coal containing from 6 to 13 p.ct. of oxygen, the admixture of from 3 to 8 p.ct. of carbonic acid producing material and from 1½ to 4 p.ct. of iron scrap gives the best results.

A sufficient quantity of the admixture to constitute a charge is delivered into a travelling overhead skip, from which it passes through a hopper to a retort. The charge should be sufficient to occupy about two-thirds of the retort, which, after being hermetically sealed, is slowly heated (preferably by producer gas) to temperatures ranging from 175° to 800° C., according to the oils required. The vapours evolved from the charge are led from the retort to a condenser, and condensed to crude oils. When the vapours from the retort cease, the temperature is increased beyond 800° C., and water in the form of a fine mist or jet is then injected into the lower part of the retort. The result is that further vapours are evolved, which are conducted as before to the condenser, and condensed into crude oils, which go to a collecting tank below. The light gases from this tank pass to a coke or absorbing tower, the coke in which has been saturated with a suitable non-volatile oil; and in their passage through the coke therein, they become condensed into oil of light specific gravity, which is recovered in the ordinary way. Any gas that escapes from the coke-tower is stored for heating, lighting, and power purposes. The crude oils in the collecting tank are withdrawn from time to time by a suction pump, and discharged into a still, where they are separated by fractional distillation, according to their different boiling points.

The residual oils from the various distillations may be again subjected to destructive distillation in the retort by being mixed with fresh quantities of powdered carbonic acid producing material and iron scrap, and the mixture subjected to temperatures ranging from 175° to 800° C., in the same manner as in dealing with the original charge. The quantities to be mixed with the residual oils vary as before, from 3 to 10 p.ct. and 1½ to 4 p.ct.—the best proportions being arrived at in this case by observation and adjustment in the course of operation.

The vapours arising from this second destructive distillation of the residual oils are passed through a second retort exactly like the first, and at the same temperature, but charged to about half its capacity with manganese dioxide and iron scrap, or its chemical equivalent, preferably in the proportion of one part of the former to two parts of the latter. The effect of these last-mentioned materials is to enhance the production of condensible gases in the retort. The vapours given off are then again condensed and fractionated according to the oil required; and when no further oils are obtained at the condenser tail pipe, the working of the retort is discontinued.

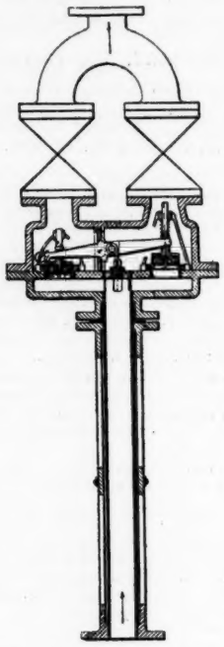
## Calorimetric Meters.—No. 115,354.

GUILLEMIN, A., and COMPAGNIE DES FORGES D'AUDINCOURT ET DEPENDANCES, of Doubs, France.

No. 12,102; Aug. 23, 1917. Convention date, June 30, 1917.

The patentees point out that it is of practical utility to be able to determine at any given moment the amount of heat set free or retained by a fluid, liquid, or gaseous mass having passed through a pipe or apparatus in a given time. Determinations of this kind would, they say, be especially useful in the case of heating plants and for hot water preparing and distributing plants. Installations for heating or for hot water supply are, it is known, often adapted to be used in common by the occupants of the same building, or in other cases are established for a group of buildings or for a city district; and by the use of a device which allows of measuring the number of calories set free by the fluid passing through the various appliances, it would be an easy

matter to divide the different expenses for combustible and the like among the different consumers, according to the amount consumed in each case. Such a distribution of expenses is commonly employed in city water, illuminating gas, and electric current supply systems, and its use is often desired for applications of hot water, and hot fluids in general; but such result could not be obtained by the use of an ordinary meter, which indicates simply the volume of flow without taking account of the temperature or density.



**Guillemin's Calorimetric Meter.**

The object of the present invention is to provide a calorimetric meter "so designed as to afford a complete solution of all problems connected with measurement of volume, temperature, rate of flow, and amount of heat in the case of hot fluids." It consists of an expansible body controlled by the temperature of the fluid to operate a device adapted to control the passage of the fluid through a volumetric meter; while a second volumetric meter is provided for recording the amount of fluid which does not pass through the first volumetric meter. The expansible body may be formed of a rod or tube (either smooth, fluted, or corrugated, and either empty or filled with a volatile liquid) fixed at one end and freely expansible at the other. This expansible body acts upon a double lever or beam pivoted at the centre and provided at each end with a slotted plunger for controlling one of the two fluid delivery orifices—the lever being held in contact with the expansible body by the pressure of a spring. At the temperature of (say) 100° C. one of the delivery orifices is fully open and the other closed; while at the temperature of 0° C. the last-mentioned orifice is fully opened while the first is closed. The temperature of the fluid at each instant is observed by the use of a pointer the movement of which depends upon the movement of the lever that operates the plungers. The pointer moves over a suitably graduated plate. Each of the two fluid delivery chambers is provided with a volumetric meter so disposed as to allow of observing not only the amount of heat carried by the delivered fluid, but also the total volume of flow, the temperature, and the average speed of the fluid.

## Obtaining a Distillate from Shale Free from Sulphur.

HEYL, G. E., of Kingsway, London, W.C.

No. 5081; Oct. 11, 1917.

The object of this invention is, in the distilling operation on sulphur-containing shale, to intercept as fully as possible the passage of the sulphur to the hydrocarbon constituents. For this purpose, it is proposed to mix with the coal or shale a proportion of mineral oil—for example, tar oil—which will enable the coal or shale oil to be distilled at a considerably lower temperature than without the addition, and then bring the mixed vapours into intimate contact with perpetually cleansed metallic surfaces so as to promote the formation of metallic sulphides at the cost of the sulphur which comes away with the vapour.

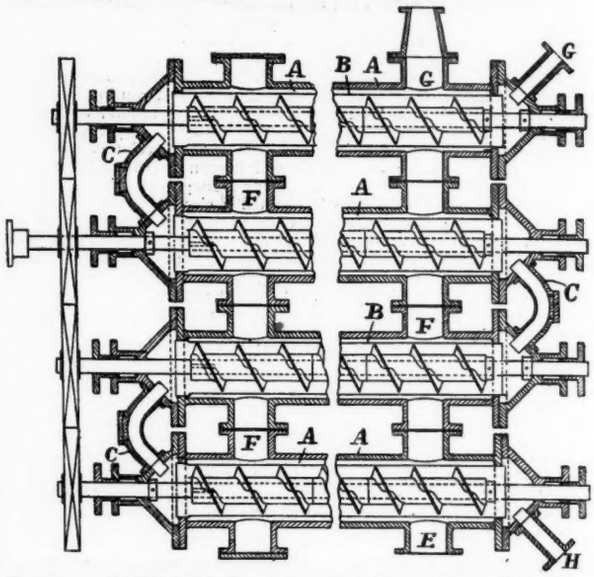
The process consists in crushing the coal or shale and grinding it with tar oil with which a proportion of scrap metal may be intermixed. A certain amount of sulphur combines with the metal when the temperature in the retort rises. But for the further elimination of the sulphur, a plurality of stills are provided, constructed on the rotating drum principle, containing metal scrap, borings, turnings, and the like. The rubbing together of the particles of metal causes the sulphide formed on their surfaces to grind away, and leave the surfaces in a metallically clean and chemically active condition. During the operation the series of rotary stills are heated at a regulated temperature, and the vapours are drawn by a vacuum pump through purifiers, scrubbers, and condensers to an oil-collecting tank—the more volatile hydrocarbon added to promote low temperature distillation being separately conserved for repeated use on additional supplies of coal or shale. Further, the sulphides formed may be roasted, and the sulphur employed in the formation of sulphide or sulphate of ammonia.

## Extracting Naphthalene Salts, &c., from the Distillates of Coal Tar.—No. 115,906.

BROTHERTON & CO., LTD., PORTEOUS, J., and WHITELOCK, E. D., of Leeds.

No. 7485; May 24, 1917.

This apparatus for cooling creosote and other oils—thereby facilitating the extraction in their solid form of naphthalene or similar substances—is so designed that the process is continuous, while in the event of choking or disablement of any part of it the disabled part may be cut-out and the process continued through the remainder.




**Porteous and Whitelock's (Brotherton & Co.) Naphthalene Extractor.**

As shown, the apparatus comprises a series of cylindrical vessels A bolted together to form a complete unit. Each cylinder is provided with a tube B fitted to each end of the outer casing so that an annular space is formed between the outer and inner tubes, but having no communication with each other. The cylinders are fitted with removable end covers and stuffing boxes, and are connected in series by bends C (each provided with an inspection door) so as to allow a free passage to the oil and solid matter through the apparatus. Through the centre of each internal tube a rotating shaft extends through the stuffing boxes, and on each of the shafts a sectional worm or spiral conveyor D is fitted; the outside diameter of the worm (preferably of cast iron) being slightly smaller than the internal diameter of the tube B. The outer ends of the shafts are geared together so as to be rotated by belting as desired.

Through the annular space between the inner and outer tubes ammonia or other refrigerant is led—first into the lowest of the cylinders of the series at E, along it to its further end, and then upwards by means of a short connecting tube F to the annular space in the next cylinder above. In this way it is circulated along each tube in zig-zag order, and exhausted from the outlet G at the uppermost of the series.

The oil is introduced by a force pump through an inlet H at the uppermost of the cylinders, and passes alternately through each inner tube by means of the removable tubular bends C arranged in alternate order to the outlet I at the lowest of the series—the oil being rapidly cooled in its passage through the inner tubes by the action of the ammonia in the annular spaces.

The revolving shafts and conveyors when set in motion scrape off any solid matter that may adhere to the side of the tubes due to the cooling action of the ammonia. The solid matter so removed is conveyed along each tube and carried away in the body of the oil to the outlet, whence it is delivered into filter presses for treatment in the usual way. The use of the conveyors, in addition to their function as combined scrapers and conveyors, also ensures that the oil is forced against the cold surface of the inner tubes in a thin layer; and as the oil can be made to travel at a greater velocity than the conveying speed of the worm or spiral, the oil has a scouring action on it, and thus keeps the passage clear by at once removing any solid matter which may be scraped off the tubes and adhere to the blades.

## Gas-Heating Burners.—No. 115,998.

HUMPHREY, A. H., of New York City.

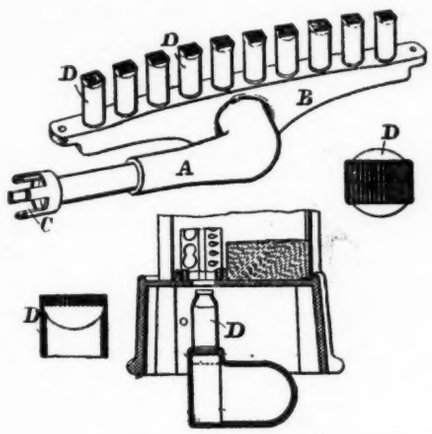
No. 12,996; Sept. 11, 1917.

These burners are of the type in which a tube has arranged within its outer end a plurality of thin bars spaced closely together. In previous arrangements these bars have either been cast with the burner, or else have been separate from it—either loosely carried in slots therein, or else threaded on pins with distance-pieces between any pair of bars. According to the present invention, the bars are secured in slots in the burner tube end by welding or brazing.

A rear perspective view of the burner is given; also a section showing the burner installed in a gas-heating device of the radiant type.

The supply pipe A (disposed longitudinally of the body) is provided with an elbow joined to the side wall B, so that the pipe delivers to the chamber centrally and at right angles to the side walls. The advantage of this is said to be that it "secures a substantially even distribution of the gas within the chamber to the several burner tubes

mounted thereon." The bunsen tube is provided with the usual air inlets. C. The gas delivery nozzle is not shown. The burner tubes D (preferably retangular at the tip) are provided with uniformly spaced vertical slits in opposite walls adapted to receive flat bars arranged in the slits and welded or brazed in position so that they have a heat-conducting union or joint with the walls of the tube.




**Humphrey's Gas-Heating Burner.**

In practice, the patentee states, very satisfactory results are secured by arranging that the thickness of the bars is substantially that of the jet apertures, and the depth of the bars approximately four times the width of the jet apertures. The maintaining of the proper proportion in depth and thickness of the bars relative to the jet apertures is of advantage in securing the best results—that is, when properly proportioned, no additional means are required to prevent back-firing. The burner tubes are entirely unobstructed below the tips; and, further, the gas burns quite close to the surface of the tips and without "streaming," even under relatively high pressures. A further advantage of the arrangement is that the structure is said to be practically noiseless.

The inventor closes his specification with these words: It is found in practice that, with gas at normal pressures delivered by the gas-mains of the average city, satisfactory results may be secured if the jet apertures are between the limits of twenty and forty thousandths of an inch; the bars being of substantially the same thickness as the width of the apertures, and the depth of the bars approximately four times the width of the apertures. With the rectangular tips, it is easily possible to secure uniformity. By slotting the tips and inserting the bars and brazing or welding them in place, satisfactory joints are formed between the bars and the walls, so that the heat is readily conducted from the bars to the walls and dissipated—thus preventing overheating of the bars, which might induce back-firing or destroy or warp the bars.

## APPLICATIONS FOR PATENTS.

**[Extracted from the "Official List" for July 3.]**

Nos. 10,355—10,774.

BIRKEDAL, H. A.—"Regenerators, and blocks for building same." No. 10,748.
BREWSTER, T. J.—"Processes of nitrating benzol." No. 10,518.
BROOKS, B. W.—"Regenerative oven or furnace." No. 10,659.
BURROWS, A.—"Automatic valves for geysers." No. 10,427.
DOUGLAS, T.—"Governors." No. 10,520.
FOX, T.—"Gas-meters." No. 10,745.
LANEGAN, W. J.—"Coke-wagon bodies." No. 10,706.
NITROGEN PRODUCTS AND CARBIDE COMPANY.—"Treatment of pitch." No. 10,759.
PERKIN, F. M.—See Nitrogen Company. No. 10,759.
PROCTER, H. C.—"Gas-engines." No. 10,389.
RADET, L.—"Apparatus for igniting and extinguishing gas-burners." No. 10,762.
ROBINSON, S.—See Fox. No. 10,745.
SOMERVILLE, J. M.—"Process for removing carbon monoxide, and manufacture of material therefor." No. 10,767.
SOUTH METROPOLITAN GAS COMPANY.—See Somerville. No. 10,767.
WALLWIN, J. M.—"Gas-heated furnaces or muffles." No. 10,589.
WELLS, E. P.—"Gas-fuel containers, and controlling-valves connected therewith." No. 10,419.
WEST, J. F.—See Burrows. No. 10,427.
WILTON, N.—"Apparatus for preparation of sulphate of ammonia." No. 10,452.
WRIGHT AND EAGLE RANGE, LTD., J.—"Gas-furnaces." No. 10,530.
YATES, H. J.—See Wright. No. 10,530.

**Vertical Retorts at Singapore.**—In the "JOURNAL" for the 25th ult. [p. 600], it was stated, in connection with the working of the Singapore Municipal Gas Department for the year 1917, that three beds of vertical retorts had been in constant use; and the whole of the gas was manufactured by this plant, which had worked most satisfactorily. The plant which has thus given so much satisfaction, with a greatly reduced staff, is the "Elland" system of intermittent vertical retorts of Messrs. Robert Dempster and Sons, Ltd.

# PARLIAMENTARY INTELLIGENCE.

## HOUSE OF LORDS.

### Progress of Bill.

The Aldershot Gas, Water, and District Lighting Bill was returned from the Commons with amendments; and the amendments were considered and agreed to.

### Coal Rationing in London.

Lord STANMORE, replying to a question by Lord Balfour as to the new coal regulations for the Metropolis, said that these were dated July 1, and would therefore come into force at once.

Earl RUSSELL remarked that he hoped offences against the regulations would not be retrospective.

## HOUSE OF COMMONS.

### Progress of Bills.

It was reported in connection with the Maidenhead and South Suburban Gas Bills that the Standing Orders had been complied with.

The Lambeth Borough Council, the Bexley Urban District Council, the Bromley Rural District Council, the Chislehurst Urban District Council, the Dartford Urban District Council, the Bromley Corporation, and the Beckenham Urban District Council have withdrawn their petitions against the South Suburban Gas Bill.

The Maidenhead Corporation and the Cookham Rural District Council have withdrawn their petitions against the Maidenhead Gas Bill.

The Brighton and Hove General Gas Company have withdrawn their petition against the West Sussex County Council (Bridges) Bill.

### Financial Hardships Bills.

On Tuesday last, the adjourned debate on the second reading of the "Financial Hardships" Gas Bills was further postponed—in the case of the majority of them until Tuesday, July 23. The date fixed is Tuesday, July 16, for the Liverpool, Commercial, Gas Light and Coke, Portsea Island, South Metropolitan, South Shields, and Alliance and Dublin Gas Bills.

### South Metropolitan Gas Bill.

The Order for the second reading of the South Metropolitan Gas Bill was read last Tuesday; the Chairman of Ways and Means having given notice to move after this that it be an instruction to the Committee to strike out the 'Financial Hardships" provisions.

Mr. GILBERT having objected to the Bill being read a second time,

Sir DONALD MACLEAN (the Deputy-Chairman of Ways and Means) said it was a matter of agreement that the Bill should go forward with the disputed clauses struck out. There were one or two domestic matters in the Bill; and he hoped that on this understanding the Bill would be allowed to proceed.

Mr. GILBERT said he must object. He understood that all the London Gas Bills were to be considered together. Members who were connected with London certainly thought that they would be taken together, and not split up.

The second reading was deferred until Tuesday, July 16.

### Brentford Gas Bill.

Major Goldman has given notice to ask the Chairman of Ways and Means to-morrow whether he can state what portions of the Brentford Gas Company's Bill the promoters intend to proceed with, and when the House will be asked to further consider the second reading of the Bill.

### Statutory Undertakings (Temporary Increase of Charges) Bill.

The promised Bill "to enable the statutory provisions affecting the charges which may be made in respect of certain undertakings to be temporarily modified," was last Wednesday presented by Sir Albert Stanley, supported by Mr. Hayes Fisher and Mr. Wardle. The text of the Bill will be found on p. 61.

The second reading stage was passed last night, and the Bill committed to a Committee of the Whole House.

### Coal Shortage in Cornwall.

Mr. HAY MORGAN asked the President of the Board of Trade whether his attention had been drawn to the present dearth of coal in Cornwall.

Mr. WARDLE, who replied, said he understood that the Controller of Coal Mines had received representations on the subject of coal for the South-Western counties. He hoped, however, that the new rationing scheme would ensure a reasonable supply of coal throughout the country.

**Coal for Gas Production.**—The Coal Controller, in a letter to the Warrenpoint (co. Down) Urban District Council, congratulating them on having 160 tons of coal in stock for gas-works purposes, and on their being able to restrict consumption to 5 tons per week, says that many undertakings of a like character have only four weeks' supply.

**Chorley and Vertical Retorts.**—Mr. J. W. Allin, the Gas Engineer to the Chorley Corporation (now appointed to West Bromwich), in his report on the undertaking for the past year, stated that the gas made showed an increase of 10½ million c.ft. The fuel used was 14,184 tons; the make being equal to 11.915 c.ft. per ton of coal carbonized. An increased yield had been obtained, due to the improved method of carbonization in the vertical retorts; and this had resulted in the saving of 1359 tons of fuel. The reduced staff in operating the plant had caused a considerable reduction in wages.

# LEGAL INTELLIGENCE.

## GAS-MANTLES OF ENEMY ORIGIN.

Two actions of the "Attorney-General *v.* Chanania" came before Mr. JUSTICE DARLING and a Special Jury on Thursday last, in which the Crown asked for the condemnation of certain incandescent gas-mantles which were alleged to be of enemy origin. Before the Jury were sworn Mr. Lever, for the defendant, asked that the case might be adjourned till after the war, in order that witnesses might be called to prove that the mantles were made in Holland. The application was opposed by the Crown, as the defendant already had had two years to prove his case, but had taken no steps to do so. His Lordship refused the application.

The ATTORNEY-GENERAL (with him Mr. Giveen), in opening the first case, said the Crown claimed forfeiture of eleven cases of gas-mantles, valued at £355. The Customs (War Powers) Act provided that where the Commissioners had reason to suspect that the country of origin was an enemy country, the goods might be seized. In the present case, the Commissioners had reason to suspect the goods were of enemy origin; and the owner had not thought fit to come and discharge the onus which was upon him.

Mr. *Cecil Bark*, the Manager of the Welsbach Company, proved that the goods in question were of German, and not Dutch, origin.

The Jury found for the Crown; and judgment was entered accordingly.

The second case was against the same defendant, and related to 13 cases—consigned from Rotterdam to the Lighting Accessories Company, in London. Evidence having been given of seizure and analysis, the Jury found for the Crown.

His LORDSHIP entered judgment accordingly, and certified for a Special Jury.

## Brighton Gas Company's Appeal.

The hearing of the appeal by the Brighton and Hove General Gas Company against the conviction for supplying gas of less than 500 B.Th.U., has, upon the application of the appellants, been postponed by the Brighton Quarter Sessions until Thursday, Aug. 1.

## A German Gas-Washer Patent.

A German gas-washer was the subject of an application last Thursday before Mr. Temple Franks (the Controller-General), in the Patents Court, when the James Keith and Blackman Company, Ltd., applied to use three patents in the name of Hans Eduard Theisen, Nos. 22,433 of 1910, 27,696 of 1911, and 1382 of 1913.

Counsel for the applicants pointed out that the process was highly esteemed, and there were thirty installations working with great success in Germany, though hitherto no plant of the kind had been tried in this country. It separated, by washing, the tar, ammonia, and heavy chemicals from gases generated at blast-furnaces, enabling them to be fed beneath boilers or used direct in engines. The apparatus consisted of a series of nutmeg-graters revolving the one inside the other, and as the gas was washed, water and gas by centrifugal force were flung out. A single unit of plant, treating a million c.ft. of gas per hour, would cost (say) £1000. The process was very effective. Messrs. Keith offered a royalty. The Controller said he should recommend the Board of Trade to issue the licence.

## Gas Explosion Sequel.

Mr. P. J. Dunne, chemist, of Ballinasloe, has been awarded £47 by the Recorder of Galway (Mr. R. Doyle, K.C.), as damages for injury to rooms and repairs to shop fittings as the result of a gas explosion. Complaint had been made to the Urban Council, as controllers of the gas supply, regarding a leakage; but no attention was paid to it.

## Theft of Blackpool Gas.

At the Blackpool Police Court, last Monday week, Jas. Clark was prosecuted, at the instance of the Corporation Gas Department, for stealing gas by means of a pipe. Mr. T. Loftos (Deputy Town Clerk) said that when a gas inspector was investigating a leakage, he traced a pipe which led to defendant's premises next door. When the inspector was going down into the cellar, the defendant stopped him and said: "I am very sorry I have got on that pipe again. This is a bad job." The inspector found that the leakage was due to an unsound connection of the pipes. In 1916, the defendant was discharged on a similar complaint of stealing gas. He was fined £10, or 49 days' imprisonment.

**Blackburn Corporation Gas Undertaking.**—Speaking at the last monthly meeting of the Blackburn Corporation, with reference to the annual report to the Gas Committee of Mr. J. W. M'Lusky (the Engineer and General Manager), Mr. E. Hamer (the Chairman of the Committee) said the past year had been one of the most severe, not only in the history of the department, but in the country generally. After alluding in detail to the figures for the year [*ante*, p. 32], Mr. Hamer said the outlook for the coming years was very far from encouraging. There was no doubt that the introduction of modern carbonizing and coke handling plant would save the consumers at least 1s. per 1000 c.ft. The Mayor (Mr. Lawrence Cotton) said the position had been rendered more acute by the refusal of the Treasury to grant any borrowing powers for the scheme of extension at the Greenbank Gas-Works. It had, therefore, been necessary to run the Addison Street Gas-Works as a supplementary supply, which entailed extra maintenance and cost.

# MISCELLANEOUS NEWS.

## HOUSEHOLD FUEL AND LIGHTING ORDER, 1918.

There was published in last Tuesday's "London Gazette" the text of the new Household Fuel and Lighting Order, 1918; but as it occupies no less than 36 columns of the "Gazette," there is no possibility of doing in the "JOURNAL" more than give the provisions specially bearing on the supply of gas and electricity, and just indicate its general contents. Readers should—as the Order came into force on the 1st inst.—lose no time in providing themselves with a copy, so as to ascertain exactly in what manner they will be effected.

### PART I.—THE SCOPE OF THE ORDER.

1.—The Order extends to coal, gas, and electricity used for heating or cooking or for any other than industrial purposes, exclusive of lighting; but it also extends to gas and electricity used for lighting purposes in connection with any house, building, or other premises in respect of which the provisions of this Order apply. It extends to coal, gas, and electricity used for industrial purposes where such industry, trade, or business is carried on in a dwelling-house or other building used in connection with a dwelling-house. It extends to coal used for the generation or production of gas or electricity in a private works, for consumption in a house, building, or other premises in respect of which the provisions of this Order as to fuel apply. It extends to coal, gas, and electricity used in laundries, bakehouses, dairies, greenhouses, and other industrial or trade premises carrying on occupations or businesses of a domestic or quasi-domestic character. It extends to coal, gas, and electricity used in any premises for industrial purposes where the total quantity to be used in any year shall not exceed 100 tons. In case of dispute as to whether any such premises come within the scope of this clause, the decision of the Controller of Coal Mines shall be final and conclusive in every case.

2.—Except where the context clearly indicates the contrary, "coal" means anthracite and all other kinds of fuel of which coal or coke is a constituent; "fuel" means coal, gas, and electricity used for all purposes except lighting coming within the scope of the Order.

3.—The Controller of Coal Mines for the time being appointed by the Board of Trade shall be responsible to the Board of Trade to exercise all the powers belonging to the Board in relation to the subject-matter of the Order.

4.—The Controller may suspend from time to time and for any period, and in any district or part of a district of a local authority, the operation of all or any of the provisions of the Order as he may think fit, and may in like manner restore such operation.

5.—The Order applies to England and Wales; and throughout the Order "month" means a calendar month; "quarter" means a three-monthly period ending as nearly as possible on March 31, June 30, Sept. 30, or Dec. 31 in any year.

### PART II.—ALLOWANCES FOR FUEL AND LIGHTING.

6.—Subject to the provisions of the Order, the allowances of fuel in respect of any dwelling-house or part thereof, or flat or tenement in separate occupation, shall not exceed the quantity prescribed in accordance with the following table, or such other quantity, whether less or more, as the Controller may subsequently determine, for any period of time or in respect of any district:

| Where the Number of Rooms Occupied is— | The Fuel Allowance for the Year shall not Exceed— | |
|---|---|---|
| | A. | B. |
| | Tons. Cwt. | Tons. Cwt. |
| Not more than 2 | 3 10 | 3 0 |
| " " " 3 | 4 0 | 3 10 |
| " " " 4 | 4 10 | 4 0 |
| " " " 5 | 5 0 | 4 10 |
| " " " 6 | 6 0 | 5 0 |
| " " " 7 | 7 0 | 6 0 |
| " " " 8 | 8 0 | 7 0 |
| " " " 9 | 9 0 | 8 0 |
| " " " 10 | 10 0 | 9 0 |
| " " " 11 | 11 0 | 10 0 |
| " " " 12 | 12 0 | 11 0 |

And for every additional room 1 ton, until a maximum of 20 tons is reached. Thereafter any additional allowance not exceeding 1 ton per room shall be in the discretion of the Local Fuel Overseer.

Provided always that, where the number of people habitually resident in a flat or tenement or dwelling-house or part thereof in separate occupation of not more than 12 rooms exceeds six, the scale allowance as determined by the above table shall be increased by 1 ton.

The two scales indicated in the tables shall apply as follows:

A. To the counties of Cheshire, Cumberland, Derbyshire, Durham, Herefordshire, Lancashire, Leicestershire, Lincolnshire, Monmouthshire, Northumberland, Nottinghamshire, Rutlandshire, Shropshire, Staffordshire, Warwickshire, Westmorland, Worcestershire, and Yorkshire, in England; and to Wales.

B. To the counties of Bedfordshire, Berkshire, Buckinghamshire, Cambridgeshire (including the Isle of Ely), Cornwall and the Isles of Scilly, Devonshire, Dorsetshire, Essex, Gloucestershire, Hampshire, and the Isle of Wight, Hertfordshire, Huntingdonshire, Kent, Norfolk, Northamptonshire (including the Soke of Peterborough), Oxfordshire, Somersetshire, Surrey, Suffolk, Sussex, and Wiltshire, in England; and to the Metropolitan Fuel Area as specially defined.

7.—Consumers may take the allowance of fuel to which they are

entitled under the table in coal, gas, and/or electricity at their option, in accordance with the following rules:

In calculating the prescribed quantity:

(*a*) Anthracite shall count as fuel at the same rate as ordinary coal.

(*b*) 3 tons of coke shall only count as 2 tons of fuel, and so in proportion for other quantities.

(*c*) Briquettes not sold by weight and not exceeding 2½ lbs. each in weight shall count as 1000 to the ton, and so in proportion.

(*d*) 15,000 c.ft. of gas shall count as 1 ton of fuel.

(*e*) 800 B.T.U. of electricity shall count as 1 ton of fuel.

The quantity of fuel to be taken as gas or electricity must be calculated to the nearest quarter of a ton.

The allowance of fuel to be taken as coal shall not be less in any case than 2 tons 10 cwt., except with the previous assent of the Local Fuel Overseer.

Any quantity of fuel allowed additional to 20 tons may be required to be taken either wholly or partly as coke.

8.—In addition to the allowances for fuel, there shall be allowed for lighting the quantities of gas and/or electricity prescribed in accordance with the following table, or such other quantities, whether less or more, as the Controller may subsequently determine for any period of time or in respect of any districts:

| Where the Number of Rooms Occupied is— | The Lighting Allowance for the Year shall not Exceed— | |
|---|---|---|
| | Either C. Ft. of Gas. | Or B.T.U. of Electricity. |
| 1, 2, or 3 . . . . . | 7,500 | 120 |
| 4, 5, or 6 . . . . . | 11,250 | 180 |
| 7, 8, or 9 . . . . . | 15,000 | 240 |
| 10, 11, or 12 . . . . . | 18,750 | 300 |
| 13, 14, or 15 . . . . . | 22,500 | 360 |
| 16, 17, or 18 . . . . . | 26,250 | 420 |
| 19, 20, or 21 . . . . . | 30,000 | 480 |

Gas or electricity allowed for lighting under this clause may, at the option of the consumer, be used for other domestic purposes, but cannot be converted into coal.

Where gas and electricity are both used for lighting, the consumer may elect to take under this clause part of the allowance as gas and part as electricity; 750 c.ft. of gas being taken for this purpose as equivalent to 12 B.T.U. of electricity, and *vice versâ*. Conversion may only take place by multiples of these quantities.

9.—Rooms shall only count where furnished and in actual occupation, except that bedrooms furnished but only occasionally occupied shall count as rooms. The following shall not count as rooms: Sculleries, bathrooms, halls not used as sitting-rooms, dressing-rooms not used as bedrooms, boxrooms, cellars, pantries not containing fireplaces or stoves, store-rooms, greenhouses attached to houses and outbuildings.

There shall not be any allowance in respect of a dwelling-house or part thereof or flat or tenement which is permanently unoccupied; and similarly any allowance shall be withdrawn or varied in respect of any temporary cessation of occupation exceeding one month in the year of the whole or part of any premises. In calculating the extent of such withdrawal or variation, the consumption of fuel and lighting for the months from May to October shall be deemed to be half the consumption for the months from November to April; but within those respective periods, the consumption of fuel and lighting shall be spread equally over the several months.

Where a consumer has more than one place of residence, the allowances or assessments of his several places of residence shall be considered as a whole, in relation to the actual occupation thereof.

10.—Not more than one-third of the total allowance of gas and/or electricity, under clauses 6, 7, and 8 may be taken in any one quarter of the year, subject to such reasonable adjustment as may be necessary when the quarter appreciably exceeds a three-monthly period, and subject also to adjustment in respect of the quantities taken in any previous quarter of the year, commencing with July 1, or such other approximate date as may relate to the premises concerned.

11.—Additional allowances not exceeding 5 tons of fuel in a year in respect of each separate household may be granted by the Local Fuel Overseer on the application of the householder, where the absence of an additional fire or additional heating or cooking or lighting is shown to cause material hardship, on all or any of the following grounds:

(1) The presence of aged or infirm persons, invalids, or young children.

(2) The occupation of separate rooms by lodgers.

(3) The use of rooms for a business or profession in a dwelling-house or other building used in connection therewith.

(4) The necessity for the upkeep of fires and light during the night as well as the day, by reason of the hours during which the householder or other resident is engaged at work.

(5) Illness; but in this case the allowances shall be of a temporary character only, in accordance with a medical certificate to be provided by the applicant.

An additional allowance shall be in fuel or in such specific fuel as coal, coke, gas, or electricity as the Local Fuel Overseer may determine. An additional allowance or part thereof may be used for lighting.

An additional allowance may in the discretion of the Local Fuel Overseer be made contingent upon the existence of surplus supplies of coal, coke, or other fuel in any month.

Further additional allowances not exceeding 5 tons of fuel in a year may be granted on the application of the householder where the supply is required for actual consumption in connection with any industrial, trade, or manufacturing process carried on in a dwelling-house or other building used in connection with a dwelling-house—such allowances to be distinct from the allowances (if any) granted for the reasons stated in the preceding part of this clause.

12.—(*a*) The occupier of a dwelling-house or part thereof or flat or tenement exceeding 15 rooms as defined above, or (*b*) the occupier of any building not used or only partly used as a dwelling-house, may apply to the Local Fuel Overseer for the district in which the premises are situated to be assessed individually, having regard to his special requirements in the way of heating, cooking, lighting, or other services, the extent and nature of his buildings, the purposes for which he consumes fuel and lighting, his previous consumption within one or more of the three years prior to July 1, 1918, and any other special circumstances; and the amount of such assessment shall be the maximum quantity to be allowed in respect of such premises either for fuel under clause 6 or for lighting under clause 8, as the case may be. Such assessment may be allowed subject to such conditions as the Local Fuel Overseer may determine.

The Controller may direct that any applications or certain classes of applications under this clause be referred to him for assessment in the first instance.

13.—Single assessments of fuel and/or lighting supplies shall, on request of any consumer or if required by the Local Fuel Overseer, be made—

(*a*) for a residential estate or farm where the proprietor, occupier, or manager supplies fuel and/or lighting to his tenants, servants, and workpeople.

(*b*) for a block of flats or tenements where the proprietor or manager undertakes wholly or partly the supply of lighting or heating or the provision of hot water or other services involving the consumption of fuel.

(*c*) for a group of houses, cottages, or rooms managed on a communal basis.

(*d*) for a dwelling-house occupied by more than one household in common.

(*e*) for a dwelling-house part of which is occupied by a sub-tenant, but such part is not separately assessed for rating purposes.

Such assessment shall have regard to any previous practice with regard to the supply or distribution of fuel and/or lighting and in the discretion of the Local Fuel Overseer or the Controller shall be either a total quantity calculated in respect of each separate household in accordance with the tables in clauses 6 and 8, or by special assessment in accordance with the provisions of clause 12.

Upon the request of a separate tenant, sub-tenant, or householder, setting out that he is unable to obtain his proper allowance of fuel and/or lighting, separate certificates of supply may be issued to each separate tenant, sub-tenant, or householder in place of the one certificate, if the Local Fuel Overseer thinks fit, without prejudice to any proceedings which may be taken against the proprietor, occupier, manager, or responsible householder in default under this clause.

14.—Where fuel is required for the generation or production of gas and/or electricity, not for public sale and distribution, but for consumption in a house, building, or other premises in respect of which the provisions of the Order as to fuel apply, the allowance of fuel to be made for such purpose shall be limited to the amount actually required for the generation or production of the quantities of gas and/or electricity to which such house, building, or other premises is entitled under the provisions of clauses 6 to 13 inclusive.

15.—Where fuel is allowed under an assessment for a specific purpose it shall not be applied to any other purpose without the previous assent of the Local Fuel Overseer. Fuel required for industrial purposes not within the scope of the Order may be purchased or acquired with household fuel, and in addition thereto, upon the declaration of the consumer as to the industrial purposes for which it is required and the production of the proper authority.

16.—Allowances and assessments shall run for one year calculated from July 1, or from such approximate date, being the date of the last meter-readings in the case of gas and electricity, or for such part of such year as there may still be to run at the date of the requisition or assessment, in which latter case the quantity allowed or assessed shall be adjusted as provided in clause 9; or, in the alternative, allowances and assessments shall run for one year from the date of the requisition. Except that where it is known, or there is reason to suppose, that an occupation is only temporary, allowances and assessments shall be for one or more months in the discretion of the Local Fuel Overseer, and shall be renewed from time to time. Provided that where the Local Fuel Overseer has reason to believe that in any premises fuel and/or lighting is being consumed at a rate exceeding that which would be reasonable under the allowance or assessment determined for such premises under or by the Order, he may cancel the yearly allowance or assessment, and in its place grant and renew from time to time an allowance or assessment for one or more months, as he may think fit.

17.—There shall be an appeal from the decision of the Local Fuel Overseer, upon any allowance or assessment under clauses 6 to 14 inclusive, in the first instance to the Local Fuel and Lighting Committee, and in the second instance to the Controller. The decision of the Controller shall be final in every case.

18.—Coal supplied to miners and other regular workers at collieries or in connection therewith shall be continued, and shall not be reduced by reason of any of the provisions of clauses 6 to 14.

### PART III.—LOCAL FUEL AND LIGHTING COMMITTEES, LOCAL FUEL OVERSEERS, &c.

19.—Each local authority shall, within fourteen days of the date on which the Order comes into effect, appoint a Local Fuel Overseer for the district. With the assent of the Controller, two or more local authorities may unite for the purpose, or a single local authority may divide their district.

21.—The local authority may appoint in each district, to supervise and assist the Local Fuel Overseer, a Local Fuel and Lighting Committee, to include one member to be nominated by the gas company or companies, or other undertakers (if any) to represent the gas-works either situated within the district or authorized to supply within the district; and one member to be nominated by the electricity company or companies or other undertakers (if any) to represent the electricity

works, either situated within the district or authorized to supply within the district.

22.—The Controller may, on the application of a local authority or of two or more local authorities uniting for the purposes of the Order, agree to such additions to or variations in the constitution of the Local Fuel and Lighting Committee as he may think desirable. In particular, where the gas and/or electricity undertaking in any district is owned by the local authority, the Controller may agree to the Chairman of the Committee of the Council charged with the oversight of such undertaking being *ex officio* a member of the Local Fuel and Lighting Committee, provided always that an additional independent member be at the same time nominated to such Committee by the local authority.

25.—Neither the Local Fuel Overseer nor the Chairman nor any member of the Local Fuel and Lighting Committee to be nominated by the local authority as independent members, shall be interested directly or indirectly in the supply or distribution of fuel or lighting on his own or any other account; but the mere fact of holding shares in any company interested in the supply or distribution of fuel or lighting shall not be a disqualification, provided that the fact is disclosed, and the Committee shall not dissent to such nomination or appointment on that account. Provided, further, that the Controller may, on representations that any member of the Local Fuel and Lighting Committee referred to in this clause is not independent and impartial, require the removal of such member and the nomination of some further member to take his place.

27.—It shall be the duty of the Local Fuel Overseer, in addition to any other duties falling to him under the Order, to deal with all questions and complaints relating to the supply, sale, or distribution of gas and electricity within the district arising out of the Order.

31.—There shall be an appeal to the Controller from any decision of the Local Fuel and Lighting Committee upon the application, interpretation, or meaning of the Order, or of any rules or instructions issued thereunder, or upon any question of principle arising thereout. There shall not be an appeal to the Controller from any decision of the Local Fuel and Lighting Committee upon any question of fact, except with the previous assent of the Committee.

Where a Local Fuel and Lighting Committee is not appointed, there shall be an appeal to the Controller from any decision of the Local Fuel Overseer or from any exercise of his discretion; and in such case the Controller shall stand in the place of the Local Fuel and Lighting Committee for all purposes. The decision of the Controller shall be final in every case.

37.—In all matters that relate to, or effect, the supply of gas or electricity under the Order, the Local Fuel Overseer shall act with the advice and assistance of the representatives of the gas or electricity companies or undertakings upon the Local Fuel and Lighting Committee respectively; and such representatives shall, for these purposes, have the same powers, and be subject to the same duties, as the Coal Merchants' Supervisor, in so far as they are applicable.

38.—Where a Local Fuel and Lighting Committee shall not be appointed, representatives shall still be nominated by the gas or electricity companies or undertakings, respectively, within any district, to discharge the duties falling on such representatives under clause 37.

39.—The Controller shall, by any duly authorized representative, have power to inquire into the acts or defaults of the Local Fuel Overseers, Coal Merchants' Supervisors, and representatives nominated by gas or electricity companies or undertakings, and to call for such reports and to take such action as he thinks fit, and may require the removal of any such person holding office and the appointment or nomination of another in his place, without prejudice to any proceedings which may be taken against the person so removed.

### Part IV.—Coal Distribution Agencies.

The fourth part of the Order, consisting of nine clauses, deals with the registration and licensing of coal distribution agencies.

41.—Gas companies producing coke for sale or distribution direct to consumers under this Order shall take out certificates of registration for each separate works, depôt, or office, at which the coke is sold or otherwise dealt in, and for the purposes of this Order be treated as registered coal merchants.

### Part V.—Procedure.

The main points in Part V. will be found set forth in the statement by Mr. E. Willis reproduced in the "Journal" a fortnight ago [see p. 598]; and there is no need to repeat them all here. Clause 50 there set out becomes clause 51 in the Order.

56.—Where gas or electricity is being supplied to any premises by a company or undertaking offering a supply to the public for reward, such company or undertaking shall be deemed to have accepted the application in respect of the supply of gas or electricity to such premises without further formality. Where gas or electricity is being supplied from some private source or is being produced by the consumer for his own purposes, full particulars of such source shall be stated on the application, and the acceptance of the person (other than the consumer) undertaking such supply shall be obtained in the same manner as for coal and coke.

58.—The Local Fuel Overseer shall, within seven days of the receipt of an application for fuel and lighting, issue or cause to be issued to the consumer in respect of the premises referred to in the application a requisition for fuel and lighting. Separate forms of requisition shall be issued for allowances under the scales set out in clauses 6 and 8 and for special assessments to be made under clause 12.

The forms of requisition shall provide separately for the sale, delivery, purchase, or acquisition of coal, coke, gas, and electricity; and the consumer shall elect, subject to the terms of the Order, in what form and proportions he desires to take his fuel and lighting allowances. The allowances of gas and electricity for lighting shall be added to, and combined with, the allowances of gas and electricity for


# Davis Items of War Time Interest

1.—National Kitchen Apparatus (Complete sets as specified by the Director of National Kitchens.)

2.—Gas-Heated Potato Steamers for Bread Bakers

3.—"Priority" Geyser in Cast Iron (Can be supplied from Stock without Priority Certificate.)

4.—"Nautilus" Coke Fire Grates (An economy factor under the New Household Fuel Order, 1918.)

5.—Fruit and Vegetable Drying Stove (Has elicited the interest of the Food Production Department.)

6.—Gas-fired Furnaces for all Purposes.

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fuel (if any); and the consumer may use such combined or total allowances either for fuel or lighting as he may think fit.

61.—Requisitions may be for a less quantity of fuel and/or lighting than that allowed under clauses 6 and 8 respectively. In such case, the consumer may, without the previous assent of the Local Fuel Overseer, submit a supplementary requisition at a later date for any quantity of fuel and/or lighting still due to him under such clauses or either of them.

62.—The Local Fuel Overseer shall, if the particulars shown on a requisition are correct, and agree with the application, issue certificates to the registered coal merchants or licensed coal dealers named thereon to supply such proper quantities of coal and coke required by such requisition, and at the same time issue certificates to the gas or electricity company or undertaking, or both, for the supply of the proper quantities of gas and/or electricity required by such requisition.

A gas or electricity undertaking shall continue the supply of gas or electricity pending the issue of the certificate; and the consumer shall be entitled to take such gas or electricity up to the quantity to which he is entitled under the terms of the Order, or, where that is not ascertained, up to his previous normal consumption as stated on his requisition, without question as to correctness or validity of it under the terms of the Order.

64.—A requisition shall not in itself be deemed to impose any obligation on a consumer to purchase or take delivery of the quantity of fuel and lighting stated in such requisition or in any certificate issued in respect thereof; nor shall the acceptance of a requisition or a certificate issued in respect thereof be deemed to impose any new or additional obligation to supply gas or electricity on any company or undertaking in fulfilment of the quantity stated therein.

66.—Where a consumer desires to cancel or vary his requisition, he must apply to the Local Fuel Overseer for the district, who will recall any certificates issued in respect thereof, and at the same time obtain a certified statement as to what supplies (if any) have been made to such consumer under such certificates; and he will then cancel such certificates and substitute therefor such new certificates in respect thereof as may be desired by such consumer for any allowances of fuel and/or lighting still due under such requisition, amended as may be necessary or desired by such consumer.

67.—Special forms of application shall be used in connection with claims for additional allowances under clause 11.

68.—When the occupier of any premises is removing, or about to remove, from such premises he shall give notice to the Local Fuel Overseer of such removal and of the address to which he is removing, in every case in which fuel and lighting are being obtained under the requisition of such occupier for such premises.

The Local Fuel Overseer shall on such notice recall any certificates issued in respect of such premises and obtain a certified statement as to what supplies (if any) have been made under such certificates; and the quantity of fuel and/or lighting so supplied if in excess of the quantity properly allowed for consumption under the certificates in respect of the period of time elapsed since the date of the requisition shall be brought into account in any new requisition of such occupier in respect of any new premises. On every change of occupation, a new requisition shall be submitted for the unexpired period of twelve months calculated from July 1 last, as provided under clause 16.

PART VI.—DUTIES OF CONSUMERS.

71.—A person being a consumer shall not consume or cause or permit to be consumed upon any premises in his occupation in any quarter gas or electricity to an amount exceeding one-third of a total yearly amount of 22,500 c.ft. of gas, or 120 B.T.U. of electricity, or such further quantities as may be allowed under the certificates issued upon his requisition, subject to any adjustments which may be permitted in respect of any reduction in consumption in the preceding quarters of the year.

PART VII.—DUTIES OF COAL MERCHANTS AND DEALERS.

The duties of coal merchants and dealers are set out at considerable length in the Order.

PART VIII.—DUTIES OF UNDERTAKERS OF GAS AND ELECTRICITY SUPPLIES, AND OTHER CLAUSES APPLICABLE THERETO.

95.—A company or undertaking supplying or offering to supply gas or electricity for reward (hereinafter referred to as an undertaker of gas or electricity supply) shall not accept a certificate of the Local Fuel Overseer for a supply of gas or electricity to any consumer in excess of his previous consumption, unless it is able to make such additional supply without prejudice to its other consumers, or unless it is expressly required so to do by the Local Fuel Overseer. In the event of refusal, the certificate shall be returned to the Local Fuel Overseer for adjustment.

96.—Where an undertaker of gas or electricity supply is, by reason of the provisions of the Order, prevented from making a supply, or from making a full supply, to any consumer, it shall to that extent be relieved of any obligation resting upon it by Statute or otherwise from making such supply.

97.—An undertaker of gas or electricity supply shall keep such records of its supplies to all consumers as the Controller may require; and such records, together with any orders, receipts, or vouchers for such supplies, and the books and accounts of such undertaker, shall be open at all reasonable times to the inspection of the duly authorized representatives of the Local Fuel Overseer of the district in which any consumer's premises are situate, or of the Controller. Further, an undertaker of gas or electricity supply shall make such returns to the Local Fuel Overseer or the Controller as the Controller may approve for the purposes of this Order.

98.—An undertaker of gas or electricity supply shall take readings of the meters of all consumers not less frequently than once in each quarter, and such other meter readings as, in the opinion of the Controller, may be found necessary to ensure the observance of the restrictions on consumption laid down in the Order.


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For the purposes of the quarterly accounts and returns required under the Order, the meter readings for each quarter shall be taken as nearly as possible to the quarter days as defined in clause 5. The system of taking meter readings shall, as far as possible, proceed according to some regular arrangement each quarter, so that the interval between the readings of the meter of any one consumer shall be approximately three months. The meter readings shall, for the purposes of the Order, be final.

99.—An undertaker of gas or electricity supply shall not, after the date on which the Order comes into effect, without the previous assent of the Local Fuel Overseer, make any new supplies for the purpose either of lighting or fuel, nor shall it fit or equip, or permit or authorize to be fitted or equipped, any premises with additional appliances for the purpose of using gas or electricity for fuel without such assent. This clause shall extend to any other persons undertaking the fitting or equipping of premises with appliances for the use of gas or electricity for fuel.

Where premises have been fitted or equipped for the purpose of using gas or electricity for fuel since May 1 last, the Local Fuel Overseer may, in his discretion, refuse to permit an additional supply of gas or electricity for such premises in respect of such new fittings or equipment.

100.—When a consumer fails to give notice of removal as required by clause 68, he shall be assumed to have consumed the gas and/or electricity shown by the next meter readings after his removal.

101.—An undertaker of gas or electricity supply shall, not later than six weeks after the close of any quarter, make a return to the Local Fuel Overseer for each district in which it makes supplies, showing for each consumer in such district the excess supply (if any) which such consumer has taken in such quarter for any premises in his occupation over the allowance shown for such consumer on the certificate received from the Local Fuel Overseer for such premises.

In calculating such excess supply, due allowance shall be made for the interval which has actually accrued between the meter readings for that and the previous quarter, and rateable adjustments made. Due allowance shall also be made for any reduction in consumption in any previous quarter of the year commencing July 1.

102.—An undertaker of gas or electricity supply shall maintain such reserves of coal for the purposes of its undertaking as the Controller may determine, and shall report to the Local Fuel Overseer or Overseers concerned and to the Controller any failure on its part to maintain such reserves. The Controller may in such event direct such general reduction or limitation in the supply of gas or electricity to consumers as he may deem necessary to provide against a failure of supply.

### Part IX.—The Sale of Coal.

In this portion of the Order it is stated that the Fuel and Lighting Committee, with the approval of the Controller, may from time to time determine the maximum prices of coal to consumers.

### Part X.—Enforcement and Penalties.

Provision is made in Part X. for the enforcement of the terms of the Order.

119.—Any failure or neglect on the part of any person to observe or conform to the terms and provisions of the Order, is a summary offence against the Defence of the Realm Regulations.

120.—Where a consumer shall have taken in connection with any premises more gas or electricity in any quarter than the quantity allowed under the terms of the Order, the Local Fuel Overseer may, in his discretion, call in any certificates under the requisition of such consumer in respect of such premises relating to coal or coke, and may cancel such certificates, issuing in their place new certificates for such less quantity of coal or coke as may then be due to such consumer after the conversion of such quantity of coal and/or coke into gas or electricity as may be necessary to provide against such excess consumption. And where such consumer shall have obtained all the coal or coke due to him under such certificates, may reduce the allowances of coal or coke of such consumer for any future period as may be necessary for such purpose.

121.—An undertaker of gas or electricity supply may, and at the request of the Local Fuel Overseer, with the approval of the Local Fuel and Lighting Committee, shall, cut off the supply to any consumer in respect of any premises at which more than the amount allowed has been consumed in any quarter or prior to the conclusion of such quarter, and shall restore such supply on such terms and conditions as may be necessary to secure the observance of the restrictions on consumption laid down in this Order.

An undertaker of gas or electricity supply may, for the purposes of this clause, enter upon the premises of such consumer, and any costs to be incurred in connection with the cutting-off or restoration of any supply of gas or electricity shall be borne by such consumer.

Any action taken under this clause shall be without prejudice to any proceedings which may be taken against such consumer for failure to observe the terms and provisions of the Order.

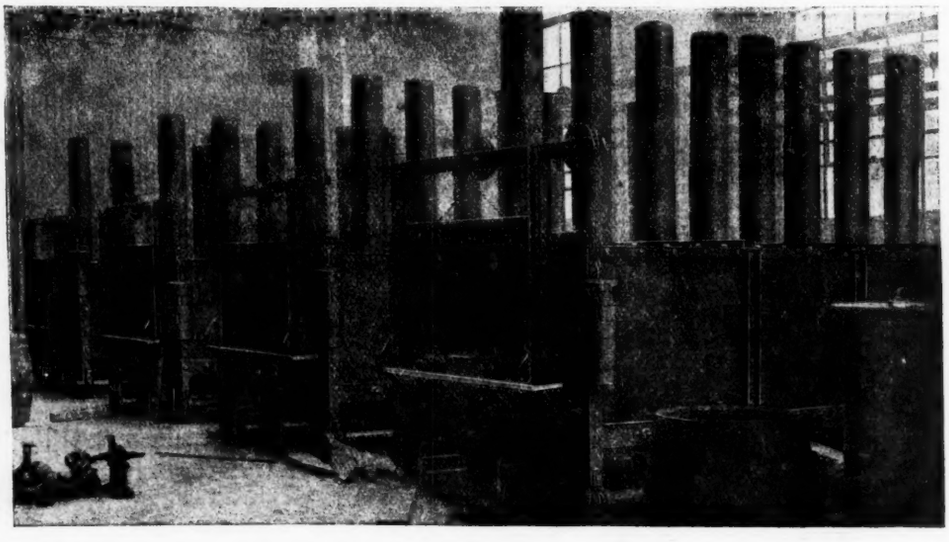
122.—Where, by reason of any compliance with the provisions of the Order, the fulfilment of any contract by any party thereto is interfered with, the necessity of complying with the provisions of the Order shall be a good defence to any action or proceeding taken against such party in respect of the non-fulfilment of such contract, so far as it is due to such interference.

### Part XI.—Metropolitan Fuel Area—Special Clauses.

123.—This Order shall be read in conjunction with the Household Coal Distribution Order, dated Aug. 10, 1917, and made by the Board of Trade; but, subject to clause 125 hereof, the terms and provisions of this Order shall, in case of difference, prevail.

124.—The Metropolitan Fuel Area for the purposes of the Order shall comprise the City of London and the district of any local authority so far as such district is included within the Metropolitan Police Dis-


Gas in War Time Industries



No. 7—Cartridge Cases.

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trict, and the following districts or parts thereof of local authorities without the Metropolitan Police District:

The municipal boroughs of Hemel Hempstead and St. Albans.

The urban districts of Caterham, Chertsey, Chorley Wood, Dartford, Egham, Epping, Esher and the Dittons, Leatherhead, Rickmansworth, Romford, Walton-on-Thames, Watford, and Weybridge.

The rural districts of Bromley, Epsom, Hatfield, and Watford.

The following parishes in the following rural districts: Chertsey.—The parishes of Byfleet, Pyrford, and Thorpe. Dartford.—The parishes of Darenth, Stone, Sutton-at-Hone, and Wilmington. Dorking.—The parish of Effingham. Epping.—The parishes of Epping Upland, Theydon Bois, and Theydon Garnon. Eton.—The parishes of Denham, Horton, Iver, and Wyrardisbury. Godstone.—The parishes of Chelsham, Tandridge (detached), Tatsfield, Titsey, and Woldingham. Hemel Hempstead.—The parishes of Bovingdon, Flaunden, Great Gaddesden, and King's Langley. Ongar.—The parishes of Lambourne, Theydon Mount, Stapleford Abbots, and Stapleford Tawney. Reigate.—The parishes of Chaldon, Chipstead, Gatton, Kingswood, Merstham, and Walton-on-the-Hill. Romford.—The parishes of Havering-atte-Bower, Hornchurch, and Noak Hill. St. Albans.—The parishes of Redbourn, St. Michael Rural, St. Peter Rural, St. Stephen's, and Sandridge Rural.

125.—The Order shall have effect in the Metropolitan Fuel Area subject to certain modifications. There shall not be established in respect of any district or part of a district of a local authority included in this area a Local Fuel and Lighting Committee. All appointments of Local Fuel Overseers (referred to as Local Coal Overseers in the Household Coal Distribution Order, 1917), or Coal Merchants' Supervisors, shall continue under the Order without express confirmation. Representatives of undertakers of gas or electricity supply shall be nominated to advise and assist the Local Fuel Overseer or the Controller, as the case may be, and to comply with the requirements of clause 38. The maximum prices of coal and coke within the area shall be fixed by the Controller.

PART XII.—MISCELLANEOUS.

The final part of the Order embraces some miscellaneous provisions.

127.—Part II. of the Lighting, Heating, and Power Order, dated March 26, 1918, and made by the Board of Trade, is hereby cancelled in respect of any premises supplied, or to be supplied, with gas or electricity under the terms and provisions of this Order.

129.—The Order may be cited as the Household Fuel and Lighting Order, 1918, and shall be read in conjunction with the Local Authorities (Fuel and Lighting) Order, 1918.

130.—Subject to the provision of clause 4, the Order shall come into effect upon July 1, 1918.

### Local Authorities and the Order.

Last Tuesday's "Gazette" also contained the Local Authorities (Fuel and Lighting) Order, 1918, which is a general Order of the Local Government Board under the Defence of the Realm Regulations, conferring upon local authorities the powers for the due discharge of the functions assigned to them by the Household Fuel and Lighting Order.

## ANOTHER RISE IN COAL PRICES.

The Board of Trade have made an Order providing for an increase of 1s. 6d. per ton in the price of all coal dispatched from the colliery for consumption in the United Kingdom on and after yesterday [Monday], to meet the cost of the increased war wage recently granted to the miners.

The prices of coal for shipment for export and as bunkers are increased by 2s. per ton in the case of all vessels the loading of which is begun on or after July 8; the 2s. being made up of 1s. 6d. to meet the cost of the war wage, and 6d. to meet increased dock charges.

The Board of Trade have also issued directions under which they assume responsibility for the payment of the war wage as from June 30, and, to provide funds for so doing, are to be credited by the collieries with 4s. per ton on all coal disposed of on and after that date. This ensures that the whole of the increases in prices which have been granted to meet the cost of the war wage shall be specifically applied to that purpose.

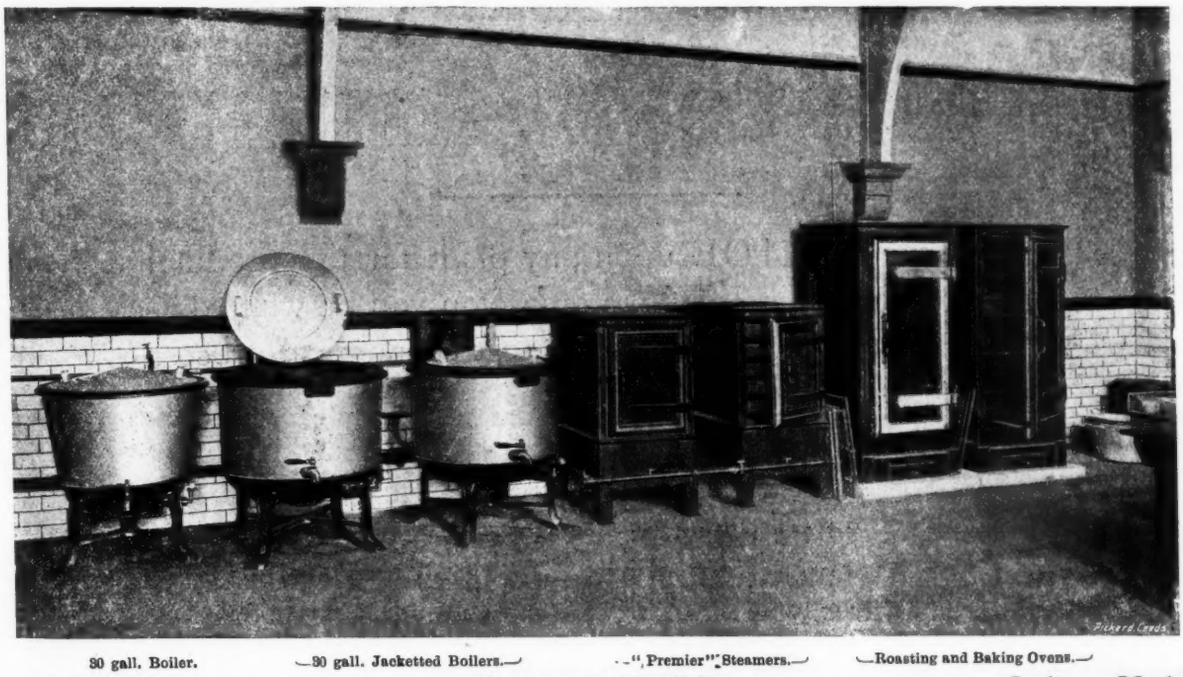
A previous increase of 2s. 6d. per ton was notified in the "JOURNAL" a fortnight ago.

## BIRMINGHAM GAS PRICES INCREASED.

At the meeting of the Birmingham City Council last Tuesday, Alderman J. H. Lloyd (in the absence of the Chairman of the Gas Committee, Sir Hallewell Rogers, on account of illness) brought forward the report of the Committee which recommended an increase in the price of gas of 4d. per 1000 c.ft. In proposing the adoption of the report, Alderman Lloyd pointed out that the Coal Controller's Order authorizing the increase of 2s. 6d. per ton in the price of coal was only published on the 22nd ult.; and as this price was to be charged on all coal delivered from the 24th, it was necessary for the Committee to immediately consider the position. The Gas Committee estimated that they would have to use, between now and the end of their financial year, approximately 800,000 tons of coal; and the 2s. 6d. advance on this quantity represented an increased cost of £100,000. In addition to this, they had to meet increased income-tax charges and rates, which together amounted to about £32,000 for the year; and presuming the consumption of gas over the remaining nine months was the same as in the corresponding period of last year, the 4d. per 1000 c.ft. recommended would only just cover the extra costs. It

The Standardized Gas Cooking Appliances for NATIONAL KITCHENS.

(AUTHORIZED FOR COOKING 500 MEALS OR 1200 TO 1500 PORTIONS.)



80 gall. Boiler. —30 gall. Jacketted Boilers.— —"Premier" Steamers.— —Roasting and Baking Ovens.—

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Manufactured and Supplied by WILSONS & MATHIESONS LTD.

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would be remembered that the 1d. advance authorized by the Council in March last was consequent upon the award of the 12½ p.ct. bonus to the workpeople; and this left no margin for any other eventualities. It was with reluctance that the Committee had to come so soon to the Council for authority to increase the prices again; but they would, he was sure, realize how impossible it was, with the constantly changing conditions, to accurately forecast the financial position. For instance, they could not tell what effect the new Household Fuel and Lighting Order might have upon the consumption of gas for domestic purposes. Any big reduction of this load might render a further revision necessary later. The outlook for coal was an extremely serious one; but as he mentioned to the Council at the last meeting, they were in constant touch with the Controller about the matter. The continued enlistment of miners had caused a substantial reduction in the output at the pits; and further difficulty was created by the necessity of exporting a large tonnage of coal to the Allies. The deliveries to the Department had, therefore, suffered proportionately. The increase of 2s. 6d. per ton would also appear to be causing trouble among the miners, with a consequent further reduction of output. They had to bear in mind that this reduced output of coal at the collieries, and the possibility of the Controller being unable to send them all the coal they might require, would render necessary the use of an increased quantity of gas oil to manufacture a larger quantity of carburetted water gas; and at the present high price of oil, this would result in a considerable loss to the department. These were all factors which were in the air, and which might, though they hoped not, necessitate later on a further increase in gas prices. It would be seen that the highest price now proposed would be 3s. per 1000 c.ft., less 5 p.ct., which was an increase of 56 p.ct. over the pre-war price.

The motion was seconded and passed without comment.

The new charges will be:

*For Lighting, Cooking, and Domestic Purposes in One Premises.*

| | Per 1000 C.Ft. per Quarter. |
|---|---|
| Up to and including 100,000 c.ft. . . . . | 3s. 0d. |
| Quantity in excess of 100,000 c.ft. up to 500,000 c.ft. . | 2 11 |
| ,, ,, 500,000 ,, ,, 1,000,000 ,, . | 2 10 |
| ,, ,, 1,000,000 ,, ,, 2,000,000 ,, . | 2 9 |
| ,, ,, 2,000,000 ,, . . . . . | 2 8 |

*For Manufacturing and Motive Power in One Premises.*

| | |
|---|---|
| Up to and including 1,000,000 c.ft. . . . . | 2 9 |
| Quantity in excess of 1,000,000 c.ft. . . . . | 2 8 |

**Subject to 5 p.ct. discount for prompt payment.**

Gas supplied through prepayment meters to be reduced as follows:

With gas fittings and cookers free, from 26 to 23 c.ft. per penny.
With cookers only free . . . . . ,, 30 to 27 ,, ,,

The Accounts of the Hull Corporation Gas Committee for the twelve months ended March 31 last show a deficit of £506.

## FINANCIAL HARDSHIPS BILL.

### Action at Preston.

A special meeting of the shareholders of the Preston Gas Company was held last Tuesday to consider the recommendations of the Select Committee on Gas Undertakings (Statutory Prices).

In a circular-letter, the Secretary (Mr. F. J. Newbound) states that the meeting passed the following resolution, a copy of which is being sent to the President of the Board of Trade and the local members of Parliament. It was suggested at the meeting that shareholders residing outside the Preston area might with advantage communicate with their local members.

> "That the shareholders of the Preston Gas Company regard the recommendations of the Select Committee on Gas Undertakings (Statutory Prices) affecting sliding-scale companies as inequitable and unjust, as the causes which have compelled an increase in the price of gas are largely the result of Government action, and entirely beyond the control of gas companies; and they strongly protest against any general legislation based on these recommendations, as involving a grave injustice to shareholders who have invested their capital in an essential industry."

The following letter, with a reprint of the Committee's report, has been sent by the Chairman (Mr. John Leigh) to each shareholder.

You will be aware that many gas companies work under a sliding-scale arrangement, which provides for a reduction in dividend if the price of gas exceeds the standard price, and *vice versâ*. The abnormal increase in the cost of coal and labour has compelled some companies to increase their price to the extent that dividends have been reduced by one-third. Under these circumstances, twenty-five of the principal companies sought relief from Parliament from the unjust incidence of the sliding-scale; and a Select Committee was appointed to consider the question. They have now issued their report—copy enclosed—and while admitting the case for relief, recommend that none be granted until the dividend has been reduced to one-half the standard rate, and only then shall the Company be entitled to charge such price for gas as will enable them to continue the payment at half the standard rate.

Although the Committee state that the varying conditions of the different undertakings render it extremely difficult, if not impossible, to lay down one general rule affecting price and dividends which would be equitable to all companies alike, they proceed to recommend that their proposals should be carried into effect by general legislation; and the President of the Board of Trade has announced his intention of introducing immediately a Bill embodying the Committee's recommendations. A general measure such as is proposed will affect every sliding-scale company, and by creating the impression that relief has been afforded will preclude an individual company from obtaining adequate relief, however deserving its case may be. The standard


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# Sulphate of Ammonia

Before you DECIDE upon any plant for the production of Neutral Sulphate of Ammonia, you will be well advised to investigate the pioneer and most economical process—

# The CAPRON NEUTRAL

*Full particulars from—*

**The Capron Neutral Sulphate of Ammonia Syndicate, Ltd.**
**Registered Offices - - 54, Rathbone Place, London, W. 1.**

price is now being charged in Preston; and an advance of 3d. will be made from the first of next month, with a further increase next year. The dividends will be reduced by 5s. p.ct. on the "A" and 3s. 6d. p.ct. on the "B" stock for each 1d. advance; and unless some modification can be obtained in the Bill, the loss to the shareholders may be increased until the dividends have been reduced to 5 and 3½ p.ct. on the "A" and "B" stocks respectively. As this loss must continue for an indefinite period, which under the most favourable circumstances cannot be a short one, the proposals amount practically to confiscation of a considerable proportion of the capital invested in gas companies.

The gas industry, at all times an essential one, has rendered vital service to the State during the war; and as the causes which have compelled an increase in price are largely the result of Government action, and beyond the control of the companies, it is a grave act of injustice to penalize the shareholders in respect of such advance.

The only hope of securing a modification of the proposals lies in an appeal to individual members of Parliament; and every effort is being made by letter and personal interview to lay before them the serious nature of the position from the shareholders' point of view.

If you can use any influence in the direction suggested, may I ask you to do so, not only in your own interest, but in the future interest of the whole industry.

### A Report to the Newcastle City Council.

In a report to the Newcastle City Council, the Parliamentary Committee, dealing with the proposed Bill of the Newcastle-on-Tyne and Gateshead Gas Company, refer to the report of the Select Committee pending the consideration of whose recommendations the Bill is suspended, though they say no definite assurance has yet been received that it is to be withdrawn. The effect of the recommendations of the Select Committee, if adopted by Parliament, will, it is pointed out, be, so far as Newcastle is concerned, that, for the duration of the war and one year or more after, instead of the present minimum dividend of £2 10s. p.ct. being increased to £4 6s., and the present maximum price of 3s. 4d. per 1000 c.ft. being increased to 3s. 10d. (with power to the Board of Trade to allow a further increase in price without any reduction of such minimum dividend), as was proposed by the Company under the Bill, the dividend will remain precisely as under the existing Acts until the price of 3s. 4d. is exceeded, after which any increase in cost will fall upon the shareholders until their dividend comes down to £1 15s. p.ct.; and that thenceforward the dividend will remain at £1 15s., and any further increase in cost will fall upon the consumers. In this way, the first £32,828 increase in the cost of production (representing 2d. in the price per 1000 c.ft. upon the present consumption of gas) will fall entirely upon the shareholders. The Parliamentary Committee are of opinion that, subject to provision being secured in any General Bill introduced into Parliament to carry into effect the Select Committee's recommendations, affording local authorities a *locus standi* with the Board of Trade as to what costs of manufacture and distribution are properly chargeable to revenue account, the recommendations of the report are not unsatisfactory from the point of view of the general body of consumers, and may be accepted.

### A Wigan Criticism.

Mr. H. Farr (the Chairman of the Wigan Corporation Gas Committee), proposing the confirmation of the minutes of the Committee at the last monthly meeting, said the Select Committee of the House of Commons set up to inquire into the difficulties of the gas industry, had presented their report. Undertakings owned by corporations were to have power to increase their statutory maxima by 50 p.ct. This new authority would no doubt be useful to them; but he considered it was unfair that the gas consumers should have to bear the large proportion of every extra charge. He was of opinion that the 50 p.ct. increase should have been added to the price of the residuals, which they had to sell at controlled prices. The condition of the industry as a whole was not satisfactory. The Gas Light and Coke Company—the largest gas concern in the world, with the most modern plant and the most scientific management—had published a statement. They were having to charge their consumers 4s. 4d. per 1000 c.ft., and were paying to the shareholders 2¼ p.ct. dividend.

## COAL TRADE AFTER THE WAR.

### Report of the Departmental Committee.

Two years ago, the Board of Trade appointed a Committee, with Lord Rhondda as Chairman, to consider the position of the coal trade after the war, with special reference to international competition, and to report what measures (if any) are necessary or desirable to safeguard that position. The other members of the Committee were Mr. A. E. Bowen, Mr. Newton Dunn, Mr. F. J. Jones, Mr. Adam Nimmo, Mr. A. F. Pease, Sir Daniel M. Stevenson, Bart., and Mr. Ridley Warham. Mr. Nimmo became Chairman on the resignation of Lord Rhondda from the Committee in consequence of his appointment as President of the Local Government Board. Editorial reference was made to the report in last Tuesday's issue.

After having held seventeen meetings and examined a number of witnesses, the Committee have prepared a report [which was issued some days ago]; but, in doing so, they point out that, owing to the constantly changing circumstances, due to the war, they have found it necessary to re-consider and re-cast certain portions from time to time, and may deem it necessary to supplement and amend it further at a later date. In the course of some preliminary considerations, it is remarked that the report is drawn up on the assumption that it is essential in the national interest that the export coal trade, which before the war amounted to about one-fourth of the entire output, should not only be maintained, but that every effort should be made to increase it. However, it is evident that the country's ability to maintain its export trade in coal, as in other commodities, must depend


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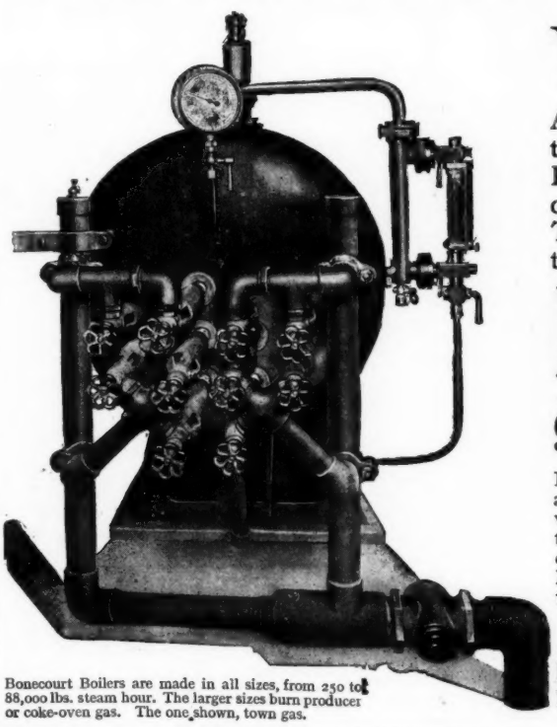


Bonecourt Boilers are made in all sizes, from 250 to 88,000 lbs. steam hour. The larger sizes burn producer or coke-oven gas. The one shown, town gas.

YOU can obtain more steam per cubic foot of gas from a Bonecourt Gas-Fired Boiler than from any other. A thermal efficiency up to 92·7% is obtainable with the Boiler and Feed Heater, which is far higher than that of other boilers operating on either Town or Producer gas, whilst its evaporative capacity is three times as great.

## BONECOURT *Gas-fired* BOILER

Brickwork, flues, and chimney are not required with a Bonecourt. This is a self-contained unit which will stand on any rigid floor. So simple is it that the slight attention required can be given by unskilled or female labour. Explosions are almost impossible. In capital cost, reduced fuel costs, and labour charges this boiler has everything to recommend it.

OUR LATEST LIST, "A BOILER EQUAL TO THREE," WILL BE SENT YOU ON REQUEST.

**BONECOURT WASTE HEAT BOILER Co., Ltd.,**
**PARLIAMENT MANS., VICTORIA ST., LONDON, S.W.1.**

upon the amount of shipping tonnage at the disposal of the country at the close of hostilities. New tonnage cannot be constructed quickly enough to make good by the end of the war the deficiency in tonnage which will then exist; and therefore it appears to the Committee that it must become a definite part of the national policy to secure to the country enemy tonnage. The necessity will also exist for the earliest possible release of all vessels requisitioned by the Admiralty.

Part I. of the report deals with output and cost of production. The output of coal in the United Kingdom during the ten years before the war increased from 232,411,784 tons in 1904 to 287,411,869 tons in 1913, when the maximum production was reached; the annual increase averaging about 5,500,000 tons. These figures (which are the outputs according to the Government returns) are greater than the quantities actually available for consumption, to arrive at which a deduction requires to be made to allow for the refuse or waste taken from the coal in the process of cleaning. The demands of the market for cleaner coal, and the fact that seams of inferior quality have now to be worked to a greater extent than formerly, make, it is said, this refuse or waste an increasing quantity. The figures show a reduction in output of over 31,000,000 tons in 1916 as compared with 1913; but by that time not only had the decline consequent upon the war stopped, but an increase in output had been taking place. At the end of December, 1916, the number of miners who had joined the Colours since the outbreak of war was 289,000; while 169,500 had been replaced. The witnesses from all districts were agreed that, owing to the special efforts which had been made to secure the maximum output with the men available, there were large arrears of repair and development work which would have to be dealt with as soon as labour and materials were available. The opinion of the Committee, based upon personal knowledge and upon the evidence taken, is that, upon the average, one year after the war may be regarded as the period of transition, so far as the production of coal is concerned; but as the war continues, the period will become longer, in consequence of repairs and other necessary work being still further in arrear. Facts point to opportunities for considerable extension of output in due course in certain districts; while other areas appear to be fully developed. Should estimates furnished to the Committee be realized, the output of coal in the United Kingdom in 1927 should exceed that of 1913 by somewhere between 28,000,000 and 34,000,000 tons.

In respect of cost of production, the evidence from every district of the country indicated that costs under practically every head have been for some years increasing; and the facts adduced have led the Committee to conclude that the cost of production will continue to be substantially higher than before the war. It is, however, necessary that, within certain limits, wages should follow prices in reasonable correspondence to enable the industry to supply coal at a cost which will provide for the industrial needs of the country, and at the same time meet the competition of foreign countries. Any considerable expansion in the coal trade must largely be in the direction of exports. The Committee fully recognized the importance of increasing the output per person employed. In the quinquennium 1906-1910, the yearly output per person employed underground averaged 340 tons. The figure was 360 tons in 1906; and 321 tons in 1913, showing a fall of 11 p.ct. Any policy involving restriction of output should be abandoned. Whether or not there is to be a rapid recovery from the devastation of the war must largely depend upon our ability to increase production generally per head of the population.

The export coal trade is dealt with in Part II.; the various countries being separately considered. During the seven years preceding the war, the quantities of coal (including coke and patent fuel converted into their equivalents in coal) shipped abroad from the United Kingdom as cargo amounted to about one-fourth of the output, and with the addition of that shipped as bunker in foreign-going vessels amounted to nearly one-third of the output. In 1913, the proportion was rather greater. A good deal of attention is devoted in the report to the suggestion that the Allies are to refuse to send coal to Germany, and to decline to import German coal; the views of the Committee on the subject being summed up in the following sentence: "Sentiment will no doubt prevent traders in the Allied countries from dealing freely with Germany for some time after the close of hostilities; but this will probably be modified, and ultimately outweighed, by the economic facts to which reference has been made."

The Committee conclude with a summary of recommendations, the first of which is that the policy of the country be directed towards maintaining, and if possible increasing, the export coal trade. All restrictions on the free export of coal should be removed as soon as practicable after the war. There are also recommendations regarding tonnage; the release at the close of the war of men who used to be employed in colliery work; increasing the output per head; and other matters. One which may be quoted is that a statutory tribunal be set up having powers: "To consider applications for, and if so advised to enforce, the granting of facilities to mineral workers or lessees for the erection on land adjoining collieries of coke-ovens, bye-product plants, chemical works, and workmen's houses, and for the treatment in such plants and works of coals raised at such collieries or elsewhere, and to fix the conditions (including compensation and tenure) upon which such facilities shall be granted."

**Whitley Scheme at Bradford.**—With the approval of the Minister of Labour, a Whitley Council scheme for Bradford Corporation employees is proposed, comprising a local Committee constituted of equal numbers of representatives of the Corporation and of the Bradford Corporation Employees' Joint Committee. This Committee are to consider all questions of wages and conditions of service, and generally all relations between the Corporation and their employees. The Corporation War Wages Committee have approved the idea, and appointed a Sub-Committee to confer with the employees and draft a full scheme for consideration. The War Wages Committee recommend a table of holidays, with pay, for all classes of employees, based on length of service.

THE "MAGNA" GAS-COOKER.

**Gas-Heated Apparatus for Works Canteens and National Kitchens.**

ARDEN HILL'S

**'MAGNA'**

**• GAS-COOKER •**

IS MADE IN VARIOUS COMBINATIONS—

SINGLE,
DOUBLE,
AND TREBLE.

All parts are interchangeable, and the Oven and Hot-Plate Burners, Burner Carriers, and Oven-Interior Fittings are removable for easy cleaning and replacement.

*Suitable schemes submitted on application without cost or obligation.*

**ARDEN HILL & Co.**

"Acme" Works,
BIRMINGHAM.

## CURRENT SALES OF GAS PRODUCTS.

### Tar Products in the Provinces.

*July 8.*

The average values for gas-works products during the week were: Gas-works coal tar, 27s. 3d. to 31s. 3d. Pitch, East Coast, 25s. to 30s. per ton; West Coast—Manchester 25s. to 30s., Liverpool 25s. to 30s., Clyde 25s. to 30s. nominal. Benzol 90 p.ct., North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 7⅞d. to 8¼d. Solvent naphtha, naked, North, 3s. 6d. to 3s. 7d. Heavy naphtha, North, 2s. 11d. to 3s. 1d. Creosote, in bulk, 4d. to 4¼d. Heavy oils, in bulk, North, 4¾d. to 5d. Carbolic acid, 60 p.ct. East and West Coasts, 2s. 6d. to 2s. 9d. naked, nominal. Naphthelene salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per unit; "B" quality, 1¼d. to 2d.

## FROM A MARKET CORRESPONDENT.

### Tar Products.

The market remains pretty well the same as a week ago, and there is not much change to be noted. The French demand for pitch shows no signs of falling off; and if shipping facilities can be arranged, a very good business can be done. London quotations continue firm at 55s. spot. Shipping prospects certainly seem better; and this is having a little effect on Provincial rates. In Manchester, up to 31s. 6d. per ton has been offered; while elsewhere some 2s. or 3s. per ton more than the uniform rate of 30s. recently arranged is being paid. There is some room for improvement, it must be admitted, as Provincial distillation costs continue to advance. South Wales is reported as likely to require less pitch than originally expected; but the markets do not appear to have been affected. In naphthalenes, only a small business is passing, and refined is inclined to be cheaper at from £28 to £30 per ton. Crudes remain without alteration at from £5 10s. to £12 10s. per ton, according to quality. Tar keeps in good demand under licence; and fuel oils are much sought after, especially high pitch sorts. Creosote, benzol, and toluol are rapidly taken up on official account. Cresylic acid is without change; but carbolic seems on the easy side, with 60% crude at 2s. 6d. and 40% crystals at 1s. 2d. Heavy naphtha is about the same; but solvent in bulk is offered at 4s. per gallon, with an extra 3d. to 6d. for small lots in drums. Aniline oil is steady, and anthracene quotations are fairly firm. The range of quotations is as under:

Benzol: 90% London, 1s. 0½d., North 10½d. to 11½d.; 50% North 1s. 4d. to 1s. 5d. naked per gallon.

Carbolic Acid: 60% East and West Coast 3s. 6d. per gallon; crystals 40% 1s. 3d. per lb.

Crude Tar: London 32s. 6d. to 35s.; Midlands 27s. to 29s.; North 28s. to 30s. per ton, *ex* works.

Pitch: London 52s. to 55s. f.o.b. works; East Coast, 33s. f.o.b.; West Coast, 31s. f.a.s.; Manchester, 30s.; Clyde 29s.; South Wales 42s.

Solvent Naphtha: Naked London 90-190% 4s. 6d.; North 3s. 9d. to 4s. per gallon; 90-160% naked London 4s. 3d. to 4s. 6d.; North 4s. to 4s. 3d. per gallon.

Crude Naphtha: Naked 30% 8¼d. to 8½d.; North 6¼d. to 6½d.

Naphthalene: Refined £30 to £32 10s.; salts 80s., bags included.

Toluol: Naked, London 2s. 4d.; North 2s. 3d.

Creosote: Nominal, London 4¼d.; North 4d. to 4¼d. (Government price, 7½s. per ton f.o.b.—equal to 4½d. per gallon); heavy oil, 4½d. per gallon in bulk.

Anthracene: "A" quality, 40-45%, 4½d. per unit; "B" quality, 1¾d. to 2¼d.

Cresylic Acid: 95%, 3s. per gallon; 97-99%, 3s. 3d. to 3s. 6d. per gallon, casks included *ex* works London and f.o.b. other ports.

Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

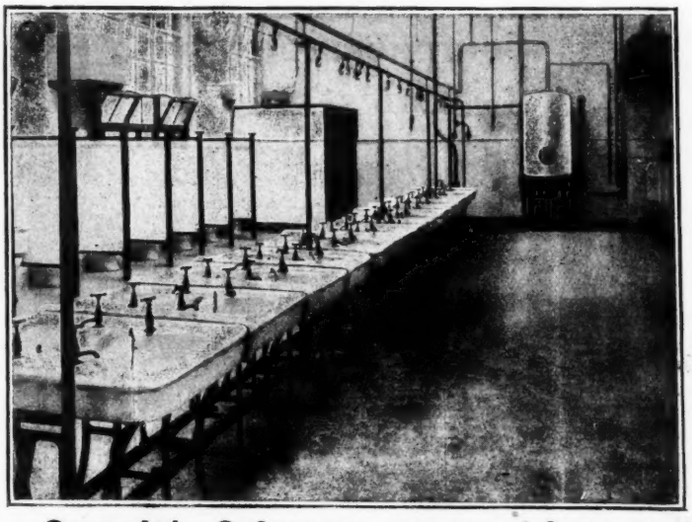
### Sulphate of Ammonia.

There is little fresh as regards home business. Exports are at a standstill; the idea being to accumulate such quantities as are not immediately required. This, coupled with the fact that American production will be materially increased this year and there will shortly be a substantial exportable balance, does not ease the minds of makers regarding the future of the trade after the war. It is recalled to mind that many markets which we used to supply are now producers themselves, and can, consequently, by means of extensions now going on, compete with us in other valuable and neighbouring markets formerly supplied from this country. The development of the industry in Japan and the comparative proximity to Australia is a case in point; both these territories being formerly supplied from home sources.

**Loughborough Gas Undertaking.**—Under war conditions, gratifying results have been attained in connection with the Loughborough gas undertaking. Mr. W. F. Charles (the Chairman of the Committee), in moving the adoption of the annual report, by the Council, stated that the gross profit was £8849, compared with £6509 in the previous year. The total expenditure had been £19,904, compared with £17,816; the increase being mainly attributable to the extra cost of coal (£1,447) and of labour (£756). Some 15 million c.ft. more gas had been made, this constituting a record. The increased profit was not due to the rising of the price of gas, as a flat-rate of 3s. 6d., affecting large consumers, had only been in operation one quarter, and increased slot charges and meter-rents only a few weeks. It was due to the increased sales, and to economy in manufacture. The net result of the year's working is a balance of £544, against a deficiency of £1728 last year.


# 'VICTOR' GAS BOILERS

***Reliability is proved by working results.***



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**"Victor" Boilers are installed in numerous factories, canteens, &c., an example of which is here depicted supplying hot water for the lavatory block in one of the most important foundries near London — the fourth installation adopted by the same company since the outbreak of war.**

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***Complete Schemes prepared for any Hot Water Requirement.***

*Write for Catalogue:—*

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**CAVENDISH WORKS, BALHAM, LONDON, S.W.**

Telegrams: "POTTERTON BAL. LONDON." Telephones: STREATHAM 2052, 2053.

**Price of Gas at Hull.**—It has been notified to the Hull Corporation that the Directors of the British Gas Light Company have again been compelled to revise the charge for gas in Hull; and the price will be advanced 2d. from 2s. 6d. to 2s. 8d. per 1000 c.ft., from the reading of the meters for the Midsummer quarter.

**Salford and the Financial Hardships Bills.**—The printed minutes of the Salford Gas Committee (confirmed at last Wednesday's meeting of the Town Council) recorded that a resolution has been passed that the relief proposed to be granted to gas companies and municipal gas undertakings is inadequate, and that the members of Parliament for the borough be informed accordingly.

**Fatality at the Bolton Gas-Works.**—At an inquest at Bolton last Saturday week, it was stated that George Sharples, a shunter at the Bolton Corporation Lum Street Gas-Works, slipped on a bolt during shunting operations, and being thrown between two wagons was badly crushed by the buffers. He died from internal injuries; and the Jury returned a verdict of "Accidental death."

**Price of Gas at Bournemouth.**—A letter submitted to the Bournemouth Corporation Lighting Committee, from the Gas and Water Company, referring to an intimation recently made that the price of gas would be increased at Midsummer, stated that, in considering the matter, the Directors had decided that, though the extra expense involved would have justified the price being raised, they would postpone the matter for the time being.

**Rise in Price at Sheffield.**—The Directors of the Sheffield Gas Company have given notice of their intention to increase the price of gas to all classes of consumers 5d. per 1000 c.ft.—such advance to date from the reading of the meters for the June quarter. This step, the Secretary (Mr. W. Hamley) states, has been necessitated through the recent rises in the price of coal, and the continued advance in the cost of all other materials used by the Company.

**Distinction for a Warrington Gas-Works' Stoker.**—Company Sergeant-Major Harry Jones, of the King's (Liverpool) Regiment, who has been awarded the Meritorious Service Medal "in recognition of valuable services with the Forces in France during the present war," was at the outbreak of war employed as a stoker at the Warrington Corporation Gas-Works. He has had a long military career; and in August, 1914, when he was mobilised he re-joined his old regiment.

**Sulphate of Ammonia Agreements.**—The printed minutes of the Stockport Corporation Gas Committee state that the Gas Engineer (Mr. S. Meunier) recently had an interview with an official of the Explosives Department, Ministry of Munitions, with reference to an increase in the price fixed by agreement with the Government for concentrated ammonia. The official referred to informed him there was a probability that some of the agreements would be suspended. In conjunction with a number of other gas undertakings, a joint case is now being prepared for presentation to the Government, justifying the application for an increased price.

**Stockport Gas-Workers' Holidays with Pay and War Bonuses.**—The minutes of the Stockport Gas Committee (confirmed at the last Council meeting) show that stokers are to be allowed seven days' holiday per year. It was further decided to pay the men's wages during their holidays, *plus* war bonus, and *plus* the 12½ p.ct.

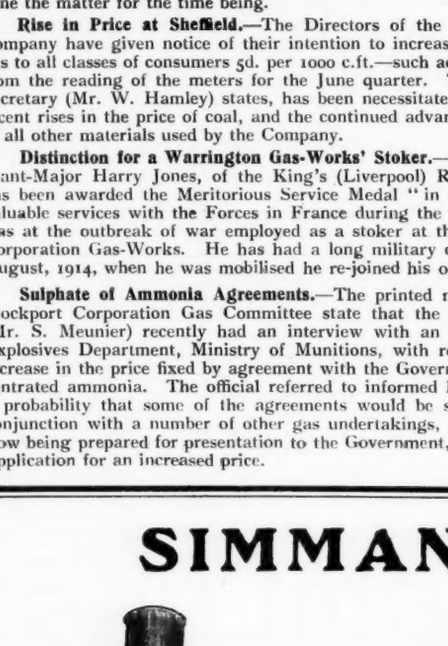
**Results at Burnley.**—In a financial review of the past year's operations of the Burnley Corporation departments, Alderman Race expressed satisfaction at the excellent record of the gas-works. It was estimated that at the end of the year there would be a deficit of £3650; but the actual result was a profit of £3860, which sum had been placed to suspense account.

**Gas Shareholders and the Government.**—Writing to the "Financial Times" on the subject of the article which was reproduced on p. 30 of last week's "JOURNAL," a "Gas Light and Coke Shareholder" says: "At a time when living is nearly double in cost, it is hard to have one's income halved. When I read the recommendations of the Committee, I was astounded. I thought it would suggest at least £3 15s. p.ct. dividends. The position of the gas shareholder is just half as bad as the holder of Russian bonds; and our Government is not supposed to be half Bolshevik. If the companies, in order to reduce the price of gas, refused to pay war bonuses, it would bring about pandemonium, not only in war work, but in the general trade of the country."

**A "Wages Committee" Advocated at Bolton.**—At the last meeting of the Bolton Town Council, Mr. Lomax, speaking on the minutes of the Gas Committee, said he wished to enter a protest on behalf of the labour members against the way in which a number of applications had been dealt with. He urged that there should be uniformity, and that employees' applications should not be subject to the goodwill, or otherwise, of any particular Committee. He suggested that the whole question of wages should be relegated to a Special Committee. Alderman Aspinall (replying on behalf of the Gas Committee) said applications were considered on their merits; and the Committee were unanimous, with the exception of Mr. Lomax, that for the present those employees were adequately paid.

**Working at Kendal.**—The report of the Kendal Corporation gas undertaking for the year ended March 31 shows a gross profit of £4733, and a net surplus of £837. The Manager (Mr. W. R. Wilson) states that again excellent results have been obtained from the Woodall-Duckham vertical retort plant. In order to conserve the coal consumption, a system of steaming charges was adopted last year, with the result that, though the quantity of gas made was greater by 4,901,100 c.ft., the decrease in coal carbonized was 495 tons 1 cwt. The cost of coal and canal dues was advanced in September last by 3s. 3½d. per ton, labour was raised in June and again in December, and materials continued to increase throughout the year. In addition, capital charges were more by £211; but the price of gas has been maintained at 2s. 11d. per 1000 c.ft., or 16·67 p.ct. above pre-war price.


# SIMMANCE'S PATENT



# TOTAL HEAT CALORIMETER

**Complies fully with the Latest Statutory requirements.**

**It automatically prevents low results** due to differences in humidity, inlet and outlet air temperature, and varying inlet water temperature, which are difficult to avoid with ordinary calorimeters.

SIMPLE AND ACCURATE.

*SOLE MAKERS—*

**ALEXANDER WRIGHT & CO.,**

**LIMITED,**

WESTMINSTER.

Agents { Australia: FYVIE & STEWART, 360, Collins Street, Melbourne.
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**Rochdale Gas Prices Increased.**—The Rochdale Town Council, at their monthly meeting last Thursday, considered the question of gas charges [*ante*, p. 36], and decided to further advance the price 6d. per 1000 c.ft. The new charges will be: Lighting, 4s. 2d. (4s. net) per 1000 c.ft.; heating, 3s. 10d. net.

**Carters and Joiners Want More at Manchester.**—At the last meeting of the Manchester Gas Committee, the Superintendent (Mr. F. A. Price) reported the receipt of an application from the Amalgamated Society and General Union of Carpenters and Joiners for the merging of the 12½ p.ct. bonus awarded to the joiners under the Building Trade Award in April in the 2d. per hour advance from May 1; and also an application from the Amalgamated Association of Vehicle Workers for an increased war wage of 5s. per week granted to carters by the Committee on Production in June. Both were referred to the Workmen Special Committee, who recommended the Gas Committee not to accede to the first-named request, being guided in this decision by a letter from Mr. P. M. Heath (the Deputy Town Clerk), who is of opinion that the proper course is for the increase to be paid as 12½ p.ct., and not as 2d. per hour in the case of certified [*i.e.*, gas] departments, in accordance with the award of the Committee on Production, and that in the non-certified departments the increase be paid as 2d. per hour without any mention of 12½ p.ct.

**Meter-Rents and Cooker Charges Re-imposed at New Mills.**—The New Mills District Council decided, at a special meeting, to increase the price of gas 4d. per 1000 c.ft., to restore meter rentals and cooker-hire charges, and to revise the rates of discount. Mr. P. Lancashire (the Gas Engineer), in his report, advised that this was necessary in view of the great increase in the price of coal and the all-round advances in wages to workmen and others. It was also decided to press the Coal Controller for a bigger ration for the Peak district.

**Lancashire Coast Towns and Amalgamation.**—For the third time in seventeen years, the question of amalgamation between Blackpool, St. Annes, and Lytham is again within the range of practical politics. Two years ago St. Annes, and afterwards Lytham, approached the Blackpool Corporation; but the negotiations fell through on the part of St. Annes, ostensibly because the Local Government Board did not look favourably on amalgamation schemes during the war, but in reality because of the opposition to the proposal shown by a number of the influential residents there. Now St. Annes has re-opened negotiations, following the consideration of the subject by a Joint Committee representing the Council and the ratepayers. The Parliamentary Committee of the Blackpool Corporation have resolved that the question should be considered; and a Special Sub-Committee has been appointed to report on the terms.

## STOCK MARKET REPORT.

THE Stock Exchange reopened last Tuesday after the prolonged closure resulting from the proclamation of July 1 as a special Bank Holiday, and at once gave some promise of at least a moderate increase of activity, together with the cheering phenomenon of a firm tone in several markets. This pleasant state of things was well maintained the next day. But on Thursday the volume of business was undergoing contraction; and, as there was no subsequent quickening-up, the week had a quiet finish on Friday. There was, however, no falling away in point of cheerfulness; and the general tendency at the close was firm. The war news, although presenting a uniform array of successful minor operations, was not on a scale to exercise any powerful influence. The supply of stock still showed a shortage which could not be neutralized by the more moderate volume of realizations to secure profits on recent rises.

The gilt-edged market was in excellent case. Home Government issues of all descriptions were firm, though the 5 p.ct. War Loan hesitated for a moment in mid-week. The continued demand for Indian was in full evidence. Home Rails had a most successful week; being in brisk demand from start to finish. Canadian did well; but Argentines were not equal to their best at the close.

The Foreign Market presented fewer noticeable features, and was generally quieter. A good point was the firmness of Italians, as might be expected from the splendid successes of General Diaz. Brazilians were dull. In the Miscellaneous Market, Insurance, Oils, and Meats were in prominent favour. Shipping was firm; Rubber and Breweries irregular.

Business in the Gas Market was much quieter; there being apparently little disposition either to buy or sell under present conditions of uncertainty regarding the new legislation which is to control the fortunes of the industry. The position of affairs has been fully placed before the readers of the "JOURNAL;" and there is neither need nor space to pursue it further in this column. The market was weaker, and prices fell. This was most marked in the Metropolitan and Suburban undertakings; and their quotations were lowered accordingly.

Money Market rates were very firm almost up to the close, when they became easier.

Bargains done for cash during the week were as follows: On Tuesday, British 30½, Commercial 4 p.ct. 60, ditto 3½ p.ct. 56, ditto debenture 51, Gas Light ordinary 59¼, 59½, 59¾, ditto preference 69, ditto debenture 54½, 54⅞, Primitiva 28s., ditto preference 52s., South Metropolitan debenture 54¼, Hornsey 75, 75½. On Wednesday, Gas Light ordinary 59, ditto debenture 55, Imperial Continental 87, Monte Video 8⅛, South Metropolitan 60, 62. On Thursday, Gas Light ordinary 58, 58¼, 58½, 58⅝, 59, ditto debenture 54⅞, Monte Video 8¾, Primitiva 28s. 3d., 28s. 6d., 29s., South Metropolitan 60, 62, Bristol 5 p.ct. 81½, Hornsey 10 p.ct. 149½, ditto 7 p.ct. 115, Newcastle 69¾, Shrewsbury 5 p.ct. 64. On Friday, British 30½, Commercial 4 p.ct. 61, Gas Light ordinary 58, 58¼, 58⅝, 58¾, 59, ditto preference 68½, ditto debenture 55, Ilford debenture 64½, Primitiva 28s. 3d., South Metropolitan 61½, 62½, Southampton 75.

The Bank rate is 5 p.ct., as fixed on April 5, 1917.

### ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

| Issue. £ | Share. | When ex-Dividend. | Ante-War Dividend & Bonus p.c. | Last Dividend. | NAME. | Closing Prices. July 30, 1914. | Present Prices. | Lowest and Highest Prices of Bargains. |
|---|---|---|---|---|---|---|---|---|
| 182,049 | Stk. | Mar. 10 | 4 | 4% | Aldershot 4 p.c. Pref. | .. | 55—60 | .. |
| 1,551,868 | " | April 8 | 2½ | 4¼% | Alliance & Dublin Ord. | 59—64 | 50—55 | .. |
| 274,000 | " | July 10 | 4 | 4% | Do. 4 p.c. Deb. | 76—79 | 68—68 | .. |
| 280,000 | 5 | April 29 | 7½ | 8% | Bombay, Ltd. | 5¾—6¼ | 5—5½ | .. |
| 50,000 | 10 | Feb. 26 | 16 | 13⅓% | Bournemouth Gas and Water { 10 p.c. | 20—30 | 21—23 | .. |
| 838,110 | 10 | " | 7 | 7% | Bournemouth Gas and Water { B ¶ p.c. | 15—15½ | 10½—11 | .. |
| 115,000 | 10 | " | 6 | 6/- | Bournemouth Gas and Water { Pref. 6 p.c. | 13½—14 | 9—9½ | .. |
| 159,740 | — | " | — | 4% | Bournemouth Gas and Water { 4 p.c. Deb. | .. | 66—68* | .. |
| 999,045 | Stk. | Feb. 26 | 14 | 4⅘% | Brentford A Consolid. | 261—266 | 76—78 | .. |
| 784,290 | " | " | 11 | 4⅖% | Do. B New | 304—309 | 67—70 | .. |
| 55,000 | " | " | 5 | 5% | Do. 5 p.c. Pref. | 109—111 | 79—84 | .. |
| 221,400 | " | June 11 | 4 | 4% | Do. 4 p.c. Deb. | 91—93 | 62—64 | .. |
| 217,880 | " | Feb. 26 | 11 | 9% | Brighton & Hove Orig. | 208—213 | 135—140 | .. |
| 244,200 | " | " | 8 | 6⅔% | Do. A Ord. Stk. | 154—159 | 95—100 | .. |
| 530,000 | 20 | Mar. 26 | 13½ | 22/6 | British | 44—45 | 30—31 | 30½ |
| 120,000 | Stk. | June 26 | 4 | 4% | Do. 4 p.c. Deb. Stk. | 88—90 | 64—66* | .. |
| 245,771 | " | " | 4 | 4% | Buenos Aires 4 p.c. Deb. | 85—87 | 50—58* | .. |
| 100,000 | 10 | — | — | — | Cape Town & Dis., Ltd. | 1½—2½ | 3⅞—4½ | .. |
| 100,000 | 10 | — | — | 4½% | Do. 4½ p.c. Pref. | 4—6 | ⅞—8 | .. |
| 100,000 | Stk. | June 26 | 4½ | 4½% | Do. 4½ p.c. Deb. Stk. | 70—75 | 60—65* | .. |
| 157,150 | " | Feb. 26 | 5 | 5% | Chester 5 p.c. Ord. | 108—110 | 79—81 | .. |
| 1,513,280 | " | Feb. 12 | 5/9/4 | 41/4 | Commercial 4 p.c. Stk. | 106—108 | 60—65 | 60—61 |
| 560,000 | " | " | 5½ | 36/8 | Do. 3½ p.c. do. | 103—105 | 55—60 | 56 |
| 475,000 | " | June 11 | 3 | 3% | Do. 3 p.c. Deb. Stk. | 69½—71½ | 51—53 | 51 |
| 800,000 | " | " | 4 | — | Continental Union Ltd. | 76—79 | 30—35 | .. |
| 200,000 | " | " | 7 | — | Do. 7 p.c. Pref. | 115—118 | 55—60 | .. |
| 278,400 | — | — | — | 11⅛% | Croydon B and C 7 p.c.. | .. | 150—160 | .. |
| — | — | — | — | 10% | Do. E | .. | .. | .. |
| 492,270 | Stk. | — | 6 | 5⅘% | Derby Con. Stk. | 123—125 | 95—100 | .. |
| 55,000 | " | — | 4 | 4% | Do. Deb. Stk. | 102—104 | 80—83 | .. |
| 1,002,180 | 10 | July 29 | 10 | 5/0 | European, Ltd. | 17½—18 | 7½—8½ | .. |
| 16,298,975 | Stk. | Feb. 10 | 4/17/4 | 37/4 | Gas Light and Coke { 4 p.c. Ord. | 98—102 | 58—60 | 58—59½ |
| 2,600,000 | " | " | 3½ | 3⅓% | Gas Light and Coke { 3½ p.c. max. | 76—79 | 52—54 | .. |
| 4,062,235 | " | " | 4 | 4% | Gas Light and Coke { 4 p.c. Con. Pref. | 96—99 | 68—70 | 68½—69 |
| 4,674,850 | " | June 11 | 3 | 3% | Gas Light and Coke { 3 p.c. Con. Deb. | 72½—74½ | 54—56 | 54½—55 |
| 180,000 | " | " | 10 | 10% | Gas Light and Coke { 10 p.c. Bonds | .. | .. | .. |
| 258,740 | " | Mar. 12 | 5 | 3⅓% | Hastings & St. L. 3½ p.c. | 87—89 | 46—51 | .. |
| 70,000 | 10 | April 29 | 11 | 8% | Hongkong & China, Ltd. | 16½—16¾ | 7—8 | .. |
| 86,600 | — | — | — | 9⅓% | Hornsey 7 p.c.. | .. | 115—125 | .. |
| 181,000 | Stk. | Mar. 12 | 7½ | 7% | Ilford A and C. | 151—154 | 90—96 | .. |
| 65,780 | " | " | 6⅔ | 5⅘% | Do. B | 115—118 | 70—75 | .. |
| 65,500 | " | June 26 | 4 | 4% | Do. 4 p.c. Deb. | 93—94 | 62—65* | 64½ |
| 4,940,000 | " | May 14 | 9 | 4½% | Imperial Continental | 150—160 | 85—88 | 87 |
| 1,235,000 | " | Feb. 12 | 8½ | 3⅔% | Do. 3½ p.c. Deb. Red. | 84—86 | 66—68 | .. |
| 235,242 | " | Mar. 12 | 6½ | 6⅓% | Lea Bridge Ord. 5 p.c. | 119—121 | 82—87 | .. |
| 2,498,905 | " | Feb. 26 | 10 | 5% | Liverpool 5 p.c. Ord. { A / B | 211—213 / 145—148 | 82—84 | .. |
| 306,082 | " | June 26 | 4 | 4% | Do. 4 p.c. Pr. Deb. Stk. | .. | 71—73 | .. |
| 75,000 | 5 | June 11 | 8 | 2/- | Malta & Mediterranean | 4½—4⅝ | 3⅝—3¾ | .. |
| 250,000 | 100 | April 1 | 4½ | 4½% | Met. of Melbourne { 4½ p.c. Deb. | 99—101 | 88—99 | .. |
| 541,920 | 20 | May 28 | 4 | 6/- | Monte Video, Ltd. | 11½—12 | 8½—9 | 8⅝—8⅞ |
| 1,875,892 | Stk. | July 29 | 4½ | 3⅓% | Newcastle&Gatsh'd Con. | 98½—99½ | 69—71 | 69⅞ |
| 629,705 | " | June 26 | 3½ | 3⅓% | Do. 3½ p.c. Deb. | 82—88 | 60—60½* | .. |
| 55,940 | 10 | Feb. 26 | 7/14/0 | 7% | North Middlesex 7 p.c.. | 14—15 | 9½—10½ | .. |
| 800,000 | Stk. | May 14 | 8 | 8% | Oriental, Ltd. | 117—122 | 101—103 | .. |
| 60,000 | 5 | Mar. 26 | 10 | 1/- | Ottoman, Ltd. | 7½—7⅝ | 2—3 | .. |
| 60,000 | 50 | Feb. 26 | 13 | 10% | Portsea, Island B | 125—131 | 80—85 | .. |
| 100,000 | 50 | " | 12 | 9% | Do. C | 118—121 | 75—80 | .. |
| 52,000 | 50 | " | 10 | 7% | Do. D | .. | .. | .. |
| 949,980 | 5 | April 29 | 8 | — | Primitiva Ord. | 5½—6 | 1⅞—1⅝ | 28/—29/- |
| 499,960 | 5 | June 26 | 5 | 2/6 | Do. 5 p.c. Pref. | 4½—5 | 2½—2⅝ | 59/- |
| 521,600 | 100 | June 2 | 4 | 4% | Do. 4 p.c. Deb. | 91—93 | 76—77 | .. |
| — | — | — | — | 4% | Do. " " 1911 | .. | .. | .. |
| 346,198 | Stk. | June 26 | 4 | 4% | River Plate 4 p.c. Deb. | 85—87 | 55—60* | .. |
| 150,000 | 10 | May 14 | 6 | 6/- | San Paulo { 6 p.c. Pref. | 10½—11 | 7½—7⅞ | .. |
| 125,000 | 50 | July 1 | 5 | 5% | San Paulo { 5 p.c. Deb. | 47—49 | 40—43 | .. |
| 185,000 | Stk. | Mar. 12 | 10 | 10% | Sheffield A | 223—224 | .. | .. |
| 209,984 | " | " | 10 | 10% | Do. B | 222—224 | 174—177 | .. |
| 628,500 | " | " | 10 | 10% | Do. C | 220—222 | .. | .. |
| 90,000 | 10 | May 28 | 9 | 6/- | South African. | 10½—11½ | 10—11* | .. |
| 6,609,895 | Stk. | Feb. 10 | 5/4/0 | 40/- | South Met. 4 p.c. Ord. | 111—113 | 60—65 | 60—62½ |
| — | — | — | — | — | Do. Pref. | .. | 93—95 | .. |
| 1,895,445 | " | July 10 | 3 | 3⅔% | Do. 3 p.c. Deb. | 72½—74½ | 54—56 | 54½ |
| 224,920 | " | Feb. 26 | 8½ | 6% | South Shields Con. Stk. | 157—159 | 121—123 | .. |
| 952,795 | " | " | 6 | 4⅘% | S'th Suburb'n Ord. 5 p.c. | 114—116 | 68—71 | .. |
| 60,000 | " | " | 5 | 5% | Do. 5 p.c. Pref. | 110—113 | 73—75 | .. |
| 135,000 | — | — | — | 4⅘% | Do. West Kent | .. | .. | .. |
| 187,558 | Stk. | June 26 | 5 | 5% | Do. 5 p.c. Deb. Stk. | 116—118 | 82—84* | .. |
| 647,740 | " | May 14 | 5 | 3% | Southampton Ord. | 99—102 | 74—76 | 75 |
| 120,000 | " | Feb. 12 | 7½ | 5⅘% | Tottenham District { A 5 p.c. | 135—138 | 90—95 | .. |
| 782,275 | " | " | 6 | 4% | Tottenham District { B 3½ p.c. | 115—117 | 65—67 | .. |
| 181,255 | " | June 26 | 4 | 4% | Tottenham District { 4 p.c. Deb. | 87—89 | 61—63 | .. |
| 182,380 | 10 | Dec. 30 | 5 | — | Tuscan, Ltd. | 5—6 | 1—2 | .. |
| 149,900 | 10 | July 1 | 5 | 5% | Do. 5 p.c. Deb. Red. | 93—95 | 45—50 | .. |
| 236,476 | Stk. | Mar. 12 | 5 | 5% | Tynemouth 5 p.c. max.. | 108½—109½ | 87—88 | .. |
| 80,000 | " | Feb. 26 | 8½ | 67/6 | Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.. | 151—156 | 100—105 | .. |
| 255,686 | " | " | 6½ | 52/6 | Do. B 3½ p.c. | 129—134 | 77—82 | .. |
| 108,075 | " | " | 5/17/8 | 47/3 | Do. C 3½ p.c. | 110—115 | 77—82 | .. |
| 352,000 | " | " | 6½ | 46/3 | Wimbledon 5 p.c. | 117—122 | 77—82 | .. |
| 98,000 | " | " | 6½ | 52/6 | Epsom 5 p.c. | 121—126 | 77—82 | .. |
| 88,416 | " | June 26 | 3 | 3% | 3 p.c. Deb. Stk. | 66—69 | 48—51* | .. |

* Ex Div.

## Increases in the Price of Gas.

Intimation is made by the British Gas Company of a further increase in the price of gas—from 2s. 8d. to 3s. 3d. per 1000 c.ft. subject to the conditions and allowances obtaining at present. At Thursday's meeting of the Bury Town Council, Alderman Kay (the Chairman of the Gas Committee) said the price of coal had been increased 2s. 6d. a ton, which practically equalled 9d. per 1000 c.ft. on the price of gas; and the Committee decided to put up the price by this amount. At Carnarvon, the price of gas has been increased 3d. per 1000 c.ft. The Cavan Gas Company have made an addition of 10d. per 1000 c.ft. to the price of gas. An increase of 6d. per 1000 c.ft. in price is announced by the Derby Gas Company. The Dundee Gas Commissioners have increased the price to 3s. 3d. per 1000 c.ft. Intimation of a forthcoming increase in the price of gas is made by Mr. C. F. Botley, the Engineer and General Manager of the Hastings and St. Leonards Gas Company. The rise will probably be about 10 p.ct.; but more precise information will be given at the earliest possible moment. The Kendal Gas Committee are raising their charge 5d. per 1000 c.ft. The price of gas at Kirkcaldy has been raised from 5s. 3d. to 5s. 7d. per 1000 c.ft. At Lincoln, the charge to ordinary consumers will, with an addition of 5d., be raised to 3s. 2d. per 1000 c.ft., and for prepayment meter users to 3s. 7d. It has been decided by the Richmond Gas Company to again increase the price of gas—to 4s. 3d. per 1000 c.ft. Owing to further rises in costs, the price of gas throughout the area of the South Shields Gas Company is to be advanced 4d. per 1000 c.ft. from the June quarter readings. The Tandragee (co. Armagh) Urban District Council have increased the price of gas to 8s. per 1000 c.ft. Before the war the price was 3s. The Thirsk Gas Company have increased the charge for gas from 4s. 6d. to 5s. per 1000 c.ft. by ordinary meters. The supply through prepayment meters is reduced from 17 to 16 c.ft. for 1d.

**Nottingham and the Calorific Standard.**—The Nottingham Corporation have decided to apply for a Calorific Standard Order.

**Reduction in Price at Galashiels.**—Somewhat exceptionally at the present juncture the Galashiels Gas Company have reduced the price of gas 2d., to 4s. 2d. per 1000 c.ft.

**Dromore Gas Supply.**—The Dromore (co. Down) Gas Company, consequent on the difficulty of obtaining supplies of coal, have decided to cut off the gas supply from customers who have installations of electric lighting. Those, however, having such installations for power purposes are not to be included under this regulation. The general effect will be the withdrawal of a large number of gas stoves and fires.

**Wages at Doncaster.**—The Doncaster Corporation Wages Special Committee recommend that workmen who are infirm and over 65 years of age, but not more than 70 years old, shall receive a further increase of 3s. per full ordinary week, and those over 70 shall receive a further increase of 2s. per full ordinary week; the advances dating from the first pay day in March last. The Gas Committee have recommended that the women at the gas-works shall be paid in accordance with the provisions of the Ministry of Munitions Order. The question of the payment of women slot-meter inspectors was referred to the Special Wages Committee, who have decided that they are not entitled to increases under the national award.

The salary of Mr. D. J. Branson, the Engineer and Manager of the Pontefract Corporation gas undertaking, has been increased by £30 per annum.

A meeting of delegates of rowing clubs has been called for tomorrow, to consider the appointment of a deputation to wait on members of Parliament, and otherwise to organize the rowing community, with a view to opposing the second reading of the Brentford Gas Bill, containing proposals for the erection of new works on the "Duke's Meadows."

Following negotiations with the Company, the Parliamentary Committee of the London County Council recommend that an agreement be entered into between the Council, the Wandsworth, Wimbledon, and Epsom District Gas Company, and Young's Brewery Company, Ltd., with regard to the closing and maintenance of a portion of Church Walk, Wandsworth. This is in relation to one of the proposals in the Gas Company's Bill now before Parliament.

The owners of the steamship "Wandle"—the Wandsworth, Wimbledon, and Epsom District Gas Company—were last week defendants in an action arising out of a collsiion in Gravesend Reach on Nov. 9, 1917, with a German vessel which had been taken over by the Admiralty. The "Wandle" was bound from the Tyne to London, with coal, and in the collision received so much damage that she had to be put ashore. The President (Sir Samuel Evans) held the "Rhenania" to be four-fifths to blame, and the "Wandle" one-fifth.

The Committee on Production have made their award with regard to the application of the manual employees of the uncertified departments of the Birmingham Corporation for the extension to them of the 12½ p.ct. bonus. The award states that the war wage advance at present being paid to the able-bodied men concerned of 21 years of age and over shall be increased to 25s. per week. It comes into operation on the first full pay day following June 6, and practically meets the demand of the men. It means an increased annual cost to the Corporation of £36,000.

## NEWSPAPERS FOR NEUTRAL COUNTRIES.

The Secretary of the War Office has issued the following order:

> The public are informed that newspapers and other printed publications will not be sent to Neutral Countries unless they are posted direct from the office of publishers or newsagents who have obtained permission from the War Office for this purpose. Persons desiring to send newspapers, &c., to Neutral Countries should, therefore, give their orders for execution to publishers or newsagents who have obtained such permission.

The Publisher of the "Journal" has obtained the required permission of the War Office; and he will, on receipt of instructions, forward copies direct from the office to any neutral country.

## WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

### Appointments, &c., Vacant.

Lady (Gas Cookery Training) for Advisory Work and Charge of Show-Room. Darlington Gas Department.

Engineer. Bristol Gas Company. Applications by July 24.

Engineer and Manager. Southend Gas Company. Applications by July 12.

Engineer and General Manager. Accrington Gas and Water Board. Applications by July 20.

Gas and Water Engineer and Manager. Tyldesley-with-Shakerley Urban District Council. Applications by July 16.

Works Superintendent. Cleethorpes Gas Company.

### Appointments, &c., Vacant (*Continued*).

Chemist. Hartlepool Gas and Water Company.

Superintendent. Nottingham Gas Department. Applications by July 22.

Foreman. No. 6469.

Meter Tester and Repairer. Barnsley Gas Company.

Retort Setters. No. 6470.

Gas-Works Fitter. No. 6471.

### Appointment, &c., Wanted.

Work by Civil Engineer. No. 6467.

### Plant, &c. (Second Hand) for Sale.

Lamp Standards and Brackets. Bacup Electricity Department.

Purifiers. Draycott Gas Company.

Purifiers. Shirebrook Gas-Works.

### Tank Wagons for Hire.

Tunstall & Co., Ltd., Leeds.

### Meeting.

Commercial Gas Company. Cannon Street Hotel. Aug. 15. Twelve o'clock.


**OXIDE OF IRON.**

**O'NEILL'S OXIDE**
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

**SPENT OXIDE PURCHASED IN ANY DISTRICT**

GAS PURIFICATION & CHEMICAL CO., LD.,
Palmerston House,
Old Broad Street, London, E.C.

**"VOLCANIC" FIRE CEMENT.**
Resists 4,500° Fahr. Best for Gas-Works.
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